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pp. 363-436.] [November 15, 1915.

TROPICAL DISEASES BULLETIN

Vol. 6. 1915. No. 7.

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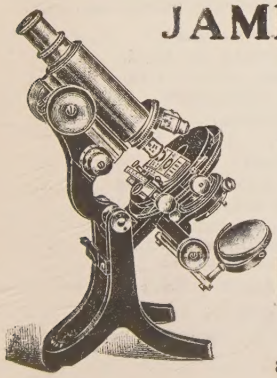

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TROPICAL DISEASES BUREAU.

TROPICAL DISEASES BULLETIN.

Vol. 6.] 1915. [No. 7.

SLEEPING SICKNESS.

BRUCE (David). **The Croonian Lectures on Trypanosomes causing Disease in Man and Domestic Animals in Central Africa.**—Delivered before the Royal College of Physicians of London on June 17th, 22nd, 24th, and 29th, 1915:—

Lancet. 1915. June 26, pp. 1323–1330. With 11 figs; July 3, pp. 1–6. With 3 figs.; July 10, pp. 55–63. With 6 figs.; July 17, pp. 109–115. With 2 figs.

Brit. Med. Jl. 1915. June 26, pp. 1073–1078. With 12 figs.; July 3, pp. 5–10. With 5 figs. and a map; July 10, pp. 48–53. With 6 figs.; July 17, pp. 91–97. With 9 figs.

The subject matter of Sir David Bruce's Croonian Lectures is well known to readers of this Section of the *Tropical Diseases Bulletin* and does not call for detailed notice. He confines himself to consideration of the disease-producing trypanosomes of Central and Southern Africa, those namely which he has had the opportunity of studying in the field under natural conditions.

Lecture I. deals with classification of the trypanosomes, which in common with most English workers he bases chiefly on morphology, pathogenic action on animals and mode of development in the tsetse fly when such occurs. The grouping is that reproduced in this *Bulletin*, Vol. 5, p. 83. The characters of the three groups are summarised.

Lecture II. is headed *Glossina morsitans*: *Trypanosoma brucei*: Wild Game. Interesting details are given of the author's investigations in Zululand, 1894–96, and the conditions under which they were made.

Lecture III. is entitled *Trypanosoma gambiense* and Congo Sleeping Sickness.

Lecture IV. deals with the trypanosomes of groups B and C, i.e. *T. pecorum*, *T. simiae*, *T. vivax*, *T. caprae*, the last few paragraphs being given to prevention of the trypanosome diseases.

The lectures are freely illustrated and contain a map showing the localities in which Nyasaland Sleeping Sickness has occurred. They render more generally accessible the observations and conclusions of the author and his colleagues in various expeditions to Africa.

A. G. B.*

* Dr. Warrington YORKE is absent on military service.

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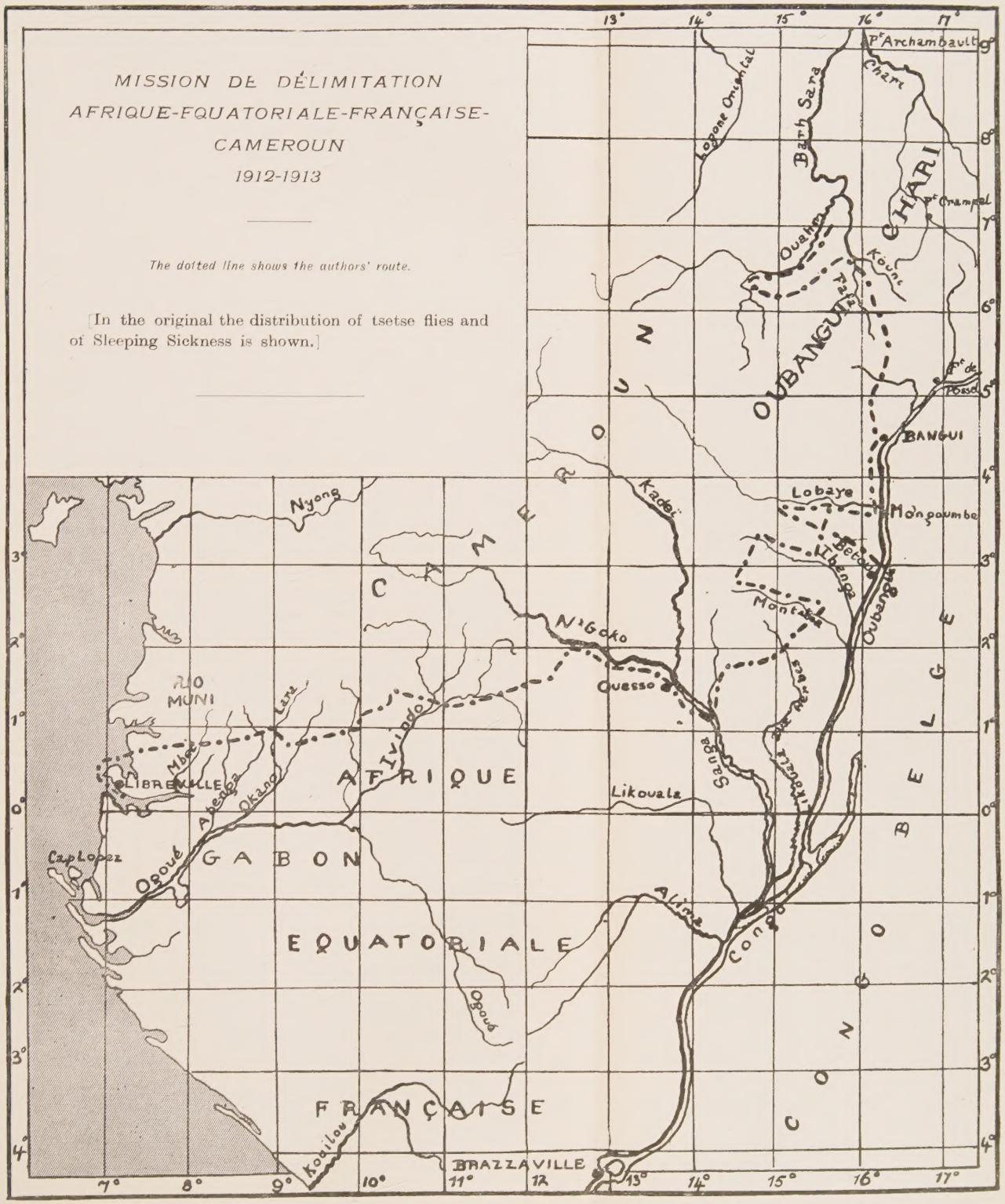
RINGENBACH (J.) & GUYOMARC'H. **Notes de Géographie médicale de la Section française de la Mission de délimitation Afrique équatoriale française-Cameroun en 1912-1913. Maladie du Sommeil.**—*Bull. Soc. Path. Exot.* 1915. July. Vol. 8. No. 7. pp. 515–546. With 1 map.

In this long paper the authors deal with their observations on sleeping sickness between the coast near Libreville and the Ouahm river, a tributary of the Shari. It is illustrated by a map which shows in a graphic manner the quantitative distribution of sleeping sickness and the distribution of tsetse flies. They refer to the chart drawn up by the French mission for the study of sleeping sickness in the Congo published in 1909* and to observations made since; in this chart there was no attempt to indicate the degree of morbidity in the various regions. They note that previously nothing was known as to sleeping sickness between the Sangha and Oubanghi rivers. Much of the paper is chiefly of local interest. The authors commence by saying that sleeping sickness in this region must be put by the side of small-pox, and in certain districts is worse than small-pox. When they reached a village their *modus operandi* was as follows:—They put the men, women, and children in three groups and noted the different diseases visible to the naked eye. They then put aside those who appeared possible sufferers from sleeping sickness; such complained of headache, fever, lassitude, weakness, pains in the limbs, or showed enlargement of the glands, oedema of the face or feet, discolouration of the hair, emaciation, cerebral excitement, etc.—one or more. Some space is devoted to the difficulties met with in such an enquiry made in regions hitherto little visited by Europeans. Sleeping sickness was not diagnosed except after the discovery of the trypanosome in the blood or gland juice. The blood was examined as a rule in one preparation for ten minutes before a negative conclusion was reached. Each group of glands was, if necessary, the subject of numerous punctures. They did not centrifuge the blood or cerebro-spinal fluid. The country through which they passed is considered under four headings:—

1. North of the Gaboon. Ivindo basin.—Between the sea and the Ivindo, which is a tributary of the Ogowe, 1,022 natives were examined; eight were found to be infected, giving a percentage of morbidity of 0·78. Details are shown in a table. It is concluded that the inhabitants of this region are very slightly affected by sleeping sickness, and this is attributed to the vigorous constitution of the natives who get abundant food, and to the small extent to which it has been visited by foreigners. The disease must have been introduced by Loangos, Bakongos or Bayas in the service of the Administration or of merchants. These races, among whom much sleeping sickness is found, furnish the greater part of the labour in this part of French Equatorial Africa. Among the porters of the Mission two such cases were found and turned back.

2. Basin of the Sangha.—Here the disease has existed for a long time. References and quotations are made from the writings of

* G. MARTIN, LEBOEUF, ROUBAUD: Rapport de la Mission d'Etudes de la Maladie du Sommeil au Congo Français, 1906-1908. (Société de Géographie). 721 pp. With 8 plates, 1 map and 135 figs. 1909. Paris: Masson & Cie.


MISSION DE DÉLIMITATION
AFRIQUE-EQUATORIALE-FRANÇAISE-
CAMEROUN
1912-1913
The dotted line shows the authors' route.
[In the original the distribution of tsetse flies and of Sleeping Sickness is shown.]
Pt Archambault
Chari
Logone Oriental
Barh Sara
CHARI
Pt Crampel
Ouahm
Kouni
Fafa
OUBANGUI
Ft de Posse
BANGUI
Lobaye
Mongoumbe
Betou
Thenga
Montaba
Oubangui
Kadei
Nyong
CAMEROUN
N'Goko
Ouesso
RIO MUNI
Lara
Mbac
LIBREVILLE
Ivindo
AFRIQUE
Okano
Abenga
Ogoué
Cap Lopez
GABON
EQUATORIALE
FRANÇAISE
Likouala
Sanga
Likouala aux Herbes
Alima
Congo
Ogoué
Kouilou
BRAZZAVILLE
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MILLOUS, HECKENROTH, KERANDEL, OUZILLEAU, and AUBERT, most of which refer to the Upper Sangha. The itinerary of the authors led them much more to the east, to the country between the Sangha and Oubanghi rivers. Some space is here given to native ideas on sleeping sickness. In eleven villages visited 947 natives were examined and 72 were found to be infected, giving a percentage of 7·6 among those examined. The details are given in a table. In one village 72 persons were examined and 15 were found to be infected, and it is noted that all these were persons who had come to assist in transport and who consequently appeared to be healthy. With regard to this and two other villages in which there was a large percentage of infected people, the authors discuss the mode of infection without arriving at a satisfactory conclusion ; one was not near water and tsetse flies were rare. Out of 21 infected children seen in the Sangha basin 17 were above the age of 5 and it is noted that children of tender age rarely leave their villages, whereas the older ones accompany their elders fishing or in canoes. The case is cited of a European who eleven months before had anaesthesia of his legs with loss of knee jerk and diminution of the pupillary reflexes and had been treated for syphilis. When seen he had oedema of the feet and his calves were tender to pressure. Trypanosomes were found in one of his glands. He had probably contracted infection sixteen months before.

3. Basin of the Oubanghi.—Detailed information of these people has been obtained by LEBOEUF, and by HECKENROTH. The authors worked principally on three large tributaries of the Oubanghi, the Motaba, the Ibenga and the Lobaye, where nothing was known in regard to sleeping sickness. Among 1,481 persons examined in 16 villages 216 were found infected, giving a percentage of 14·5, twice as high as that obtained in the Sangha basin. Most of the cases were found in villages on the banks of the Motaba and Ibenga rivers. One-third of the population of the Motaba river was infected and this is probably below the truth, for only people in apparent good health were examined. Instances are given in which more than one inmate of a house was infected. These are believed to demonstrate the existence of family contagion and to explain the disappearance of whole villages. On the Lobaye river the percentage of infection is much less, only 4 or 5 per cent. This is perhaps to be attributed to the better nourishment and higher grade of living of the natives concerned.

The authors made three canoe journeys on the Motaba river and tried a means of preservation against tsetse bites. Half of their 16 canoe men were smeared with palm oil and the other half served as controls. In two hours, whilst 119 tsetse settled on the bodies of smeared natives, 173 alighted on the others. It is noted that the former did not remain long and bit but rarely, whilst the latter did not leave till they had become engorged or had been chased away. It is concluded that this process had some effect. It is noted that for protection against insect bites natives of the Sangha anoint themselves with palm oil sprinkled with powder from a red wood, which acts at once as a protection and as an ornament.* In this region three

*Compare the ointment used by the Ngombi tribe (*Sleeping Sickness Bulletin*, Vol. 2, p. 126) and the Rev. A. R. RUSKIN's further observations thereon (*loc. cit.*, p. 368).

patients were found with psychical symptoms of a special kind. Two of them, aged 10 and 12, had that form of ambulatory automatism which is called by REGIS "dromomania." They would get up and move away in one direction, return and go off in another without object and as if impelled by necessity. Their movements were irrational and unconscious. Reference is made to the memoir of G. MARTIN and RINGENBACH*.

4. Basin of the Ouahm.—Previous information about this region was obtained by KERANDEL in 1907, some of whose observations are quoted. He did not find the disease north of Carnot on the Upper Sangha (5° N.). The population here was hostile and very few examinations could be made. It is stated that at only two villages are they of value. In one of these 82 were examined and 16 were found infected; at the other 59, and 9 infected. From their investigations and information obtained they concluded that the disease exists in the valleys of the Koumi, Fafa and on the banks of the Ouahm. There seems little doubt that it has been introduced since 1907 by Hausa traders from the south and east, who go to purchase rubber, and attention is drawn to the fact that European colonisation has especially helped in the dissemination of sleeping sickness. At present the Logone river is believed to be free, but when the country becomes more settled it is thought that the Hausas will take the disease there.

A few remarks are added on the epidemiology. Man appears to be the sole reservoir of the virus in the country passed through; big game is relatively rare. Transmission seems to be effected directly in a purely mechanical way, and indirectly. Indirect transmission is accomplished by tsetse flies. Other biting insects may play the part of mechanical vectors. In one village where 12·5 per cent. of the population were infected tsetse flies were very rare. *G. palpalis* was met with everywhere along the banks of rivers; other tsetse flies in places stated.

As to prophylaxis, the authors recommend the injection of remedies like atoxyl to sterilise the patients for at least two months, and draw attention to the excellent results obtained by OUZILLEAU [see this *Bulletin*, Vol. 6, p. 175]. The protection of districts free from the disease must be secured by the careful inspection of natives who seek to enter them.

A. G. B.

YORKE (Warrington) & BLACKLOCK (B.). **The Reservoir of the Human Trypanosome in Sierra Leone.** [Being the Third Report of the Thirty-second Expedition of the Liverpool School of Tropical Medicine 1914–1915.]—*Ann. Trop. Med. & Parasit.* 1915. July 31. Vol. 9. No. 3. pp. 383–390.

During the authors' stay in Sierra Leone two cases of sleeping sickness were brought to their notice, in a mother and child who lived four miles from Freetown. Trypanosomes were first seen in the mother's blood in an examination for malarial parasites about the beginning of 1914. She received an injection of salvarsan and returned home.

*Troubles psychiques dans la maladie du sommeil.—*L'Encéphale.* 1910. Ann. 5. 1 semestre. No. 6, pp. 625–671; 2 semestre. No. 8, pp. 97–119.

CASES INFECTED WITH *T. GAMBIENSE.*

1. H. K. The type case died in Liverpool after, probably, $1\frac{2}{3}$ years' illness.

	Probable date of onset of symptoms.	Trypanosomes found.	Ocular changes noted.	Latest Reports.	Result.	Duration of disease. Years.
2. Mrs. M. ..	1900–1901.	July, 1902.	Both eyes—the 2nd. after an interval of fourteen years.	Fair health.	Recovery.	14
3. Mrs. S.	1901.	Oct., 1902.	Nil.	—	Death S.S. Nov., 1903.	$2\frac{1}{4}$
4. J. M.	June, 1902.	March, 1903.	Nil.	—	Death S.S. 1906.	4
5. Mrs. G... ..	—	1902.	—	—	Recovery.	12
6. Z.	—	July, 1905.	Choroiditis.	Fair health.	Recovery.	10
7. Mrs. R... ..	June, 1905.	Sept., 1905.	Nil.	Fair health.	Recovery.	10
8. H. C. C. S. ..	— 1905.	Feb., 1906.	Nil.	Fair health.	Recovery.	10
9. E. J. G. .. (10 in old list).	Dec., 1907.	June, 1908.	Iridocyclitis 1909 (?) specific.	—	Death, Nov. 3, 1910.	
10. C. G.	Nov., 1906.	Jan., 1907.	Nil.	Fair health.	Recovery—wounded in war	10
11. C. V.	July, 1909.	June, 1910.	Nil.	Fair health.	Recovery.	6
12. A. P.	July, 1907.	July, 1907.	Nil.	Fair health (no recent information.)	Recovery.	9
13. Dr. McD. ..	Dec., 1909.	Dec., 1909.	Nil.	Fair health.	Recovery.	$5\frac{1}{3}$
14. S. S. W. ..	Sept., 1914.	Oct., 1914.	Nil.	Fair health, but trypanosomes were present recently.		
15. A. S.	March, 1915.	March, 1915.	Nil.	Fair health.		
			Rhodesian	Cases.		
16. W. G.	Sept., 1909.	Oct., 1909.	Nil.	—	Died Dec., 1912, convulsions.	3
17. H. R. T. ..	March, 1912.	July, 1912.	Iritis.	—	Died Aug., 1912, cardiac failure.	$\frac{5}{12}$
18. A. C. E. ..	April, 1912.	May, 1912.	Iritis.	—	Died Sept., 1912.	$\frac{5}{12}$
19. H. N. McC. ..	Oct., 1913.	—	Iritis.	—	Died July, 1914.	$\frac{10}{12}$
20. Lewis	—	—	—	—	—	
21. G. N. B. ..	Dec., 1913.	—	Iritis.	—	Died June, 1914.	$\frac{5}{12}$
			Nigerian	Cases.		
22. W. R. E. .. (old 9).	Sept., 1906.	Jan., 1907.	Nil.	—	Died March, 1908, pneumonia.	$1\frac{1}{2}$
23. D. H. L. ..	Aug., 1908.	(?) Aug., 1909,	Nil.	—	Died 1911, septicaemia.	$2\frac{10}{12}$
24. C. W. B. ..	July, 1910.	July, 1911.	Nil.	—	Died May, 1914 (?) para.	$3\frac{10}{12}$
25. W. H. S. ..	Aug., 1913.	Jan., 1914.	Iritis.	—	Good health.	$1\frac{10}{12}$
26. E. C. S. ..	July, 1913.	Feb., 1914.	Iritis.	—	Good health.	$1\frac{11}{12}$
27. P. A. A. ..	Sept., 1913.	Dec., 1914.	Iritis.	—	Fair health.	$1\frac{6}{12}$
28. Dr. J. W. T. ..	Oct., 1914.	Nov., 1914.	Nil.	—	Fair health.	$\frac{6}{12}$
29. W.	Oct., 1914.	Nov., 1914.	Nil.	—	Fair health.	$\frac{6}{12}$

When seen in December her condition was good; trypanosomes could not be found in the blood or gland juice, but of two rats inoculated with blood one showed trypanosomes 38 days later. A trypanosome was found in the blood of the child (a boy aged 8) in December, also in the course of an examination for malarial parasites. Two rats inoculated from him failed to become infected and subsequent examinations of his blood were negative. He had no puncturable glands. The above records show that sleeping sickness is very chronic in Sierra Leone and very difficult to recognise.

The authors discuss the question of reservoirs and conclude that while wild game is the chief reservoir for human trypanosomiasis in South Central Africa man plays this part in Sierra Leone. There is however another possible source, domestic stock. They recall that the Sleeping Sickness Commission of the Royal Society in an examination of 17 cattle for *T. gambiense* in Uganda found one infected. Cattle are not bred in Sierra Leone, but are imported in large numbers from French Senegal. From a herd of 90 Government cattle nine (every tenth animal) were chosen for the purpose of inoculating their blood into rats; in one case the rat showed infection with what is believed to be a human trypanosome in fourteen days. The ox appeared quite healthy and direct examination of its blood was negative. The trypanosome isolated was polymorphic, had no posterior nuclear forms, and was indistinguishable morphologically from the trypanosome isolated from the human case. Tables showing the results of inoculation of this strain and the human strain respectively into rats and guinea-pigs are given. In each case infection when obtained was very chronic, and in many animals failed. The authors are of opinion that the ox trypanosome is *T. gambiense* and that cattle form a reservoir of infection in Sierra Leone.

As regards the importance of this source of infection we require to know whether the animals harbour the trypanosomes for long periods without showing signs of disease and what percentage of animals is infected. Four months later the ox was in perfect health. The authors note that this trypanosome was found largely by chance. A direct examination of blood of 143 cattle was negative for *T. gambiense*. Moreover, rats often fail to become infected, so that it will be hard to ascertain the percentage of infected cattle.

Reference is made to some observations of Macfie on the transmission of the human trypanosome described by him in Nigeria. He holds that there is an unknown vertebrate reservoir, man not serving in this capacity [see this *Bulletin*, Vol. 5, p. 91]. Reasons are given for rejecting this hypothesis. "There is no evidence which would lead us to believe that man does not constitute a most important reservoir of the human trypanosome of West Africa." The existence in domestic stock of a potential reservoir of *T. gambiense* must, however, be taken into account.

[Besides the observations of Bruce and his colleagues in Uganda, the authors might have noted those of Kleine and Eckard in the Tanganyika region [this *Bulletin*, Vol. 2, p. 347]. In an examination of 5 cattle, 55 goats, and 25 sheep from districts heavily infected with sleeping sickness one ox, one goat, and one sheep were found to be infected with a trypanosome which, for reasons stated, was believed to be identical with *T. gambiense*.] A. G. B.

DANIELS (C. W.). **Further Histories of Cases of Trypanosomiasis treated in England, and Further Cases.**—*Jl. Trop. Med. & Hyg.* 1915. July 15. Vol. 18. No. 14. pp. 157–159.

In 1911 and 1912 the author recorded cases of this disease in Europeans who had been under observation at the London School of Tropical Medicine [see *Sleeping Sickness Bulletin*, Vol. 4, p. 18, and this *Bulletin*, Vol. 1, p. 273]. In the last paper a table was published showing that eleven cases were free from symptoms. These have not all remained so, and reference to the table shows that three have died. Of the first five cases, diagnosed before atoxyl was introduced, the author writes as follows :—

"Two had recovered, and are still in good health, thirteen years or more after the onset, but one is of special importance as the probable date of infection was 1900 to 1901, and she then had severe iridocyclitis, which necessitated the removal of one eye. Since then, though she has been free both from symptoms and also from parasites and was treated with atoxyl, and for the last three years has been resident in Canada, she has had iridocystitis [*sic*] of the remaining eye, and as there has been no chance of recent re-infection, suspicion is aroused that in this disease late manifestations corresponding to the parasyphilides may occur."

Of the next five cases, treated by atoxyl, one, 'E. G.' (No. 10) died with nerve symptoms of a rather indefinite character after having been free from parasites and symptoms for 18 months. Apropos of another who died after two years good health the author remarks :—

"The possibility of late or para effects in this disease as in syphilis will have to be faced and the analogies of the late stage of the one—sleeping sickness and iritis—with the late stages of the other—general paralysis of the insane and eye lesions, etc.—renders this possibility more probable."

In the present paper the cases are grouped according to the region where the disease was acquired. The Nigerian cases are grouped separately as some of them may belong to the strain described as *T. nigeriense*.

Affections of the eye are discussed, especially iridocyclitis. The author says that probably it is more common than the notes indicate, as at first eye troubles were attributed to arsenical treatment. The table shows the occurrence of these symptoms. With reference to the Nigerian cases he writes :—

"Very small forms are described as the characteristic of the true *T. nigeriense*, but Wenyon finds similar small forms in rats infected from No. 26, though clinically there is nothing to distinguish this case from the others from Nigeria. We yet have no reason to consider that our cases infected in Nigeria, four at least infected on the Benue River, are clinically different or milder than those from other parts of West Africa, and one would be disposed to consider that they were the ordinary infection with *T. gambiense*, but that is the only one in which lower animals were infected : the small forms supposed to be the characteristic of *T. nigeriense* were found in rats. . . . Nothing yet has been noted in cases from Nigeria that could, on clinical grounds, render any separation justifiable."

Dr. Daniels has been well satisfied with prolonged use of atoxyl or soamin in doses of 3 to 4 gr. on alternate days. He gives antimony at the same time. The preparation he uses is antiluetin, which can usually be taken in half to one grain doses daily without objectionable symptoms. We are still, he writes, in want of a satisfactory antimonial preparation.

A. G. B.

SARTORY (A.), LASSEUR (Ph.) & BRISSAUD (H.). **Un cas de trypanosomiase chez un homme ayant quitté l'Afrique depuis huit ans.**—*Bull. Acad. Med.* 1915. May 31. 3e ser. Vol. 73. 79 année. No. 21. pp. 631–633.

In 1895, at the age of 21, the patient was sent to Algeria to do his military service. He was twelve years in that country, of which two and a half years were spent at El Golea in the south, and took part in the Timimounn expedition. He was often associated with black troops. He was never ill. On the return from El Golea he had three attacks of intermittent fever, of rapid onset, lasting only two or three hours with fever, shivering, and profuse perspiration, the latter not being a feature of the later illness. In 1907 he returned finally to France and resided at Tarbes (Hautes Pyrénées) and then Dijon. In 1911 he retired and lived at Tarbes till the mobilisation in 1914. In 13 years' married life his wife had never seen him ill.

In August 1914 he went to the Nancy front, where he was not in contact with black troops. In December he was seized suddenly with a prolonged rigor, intense headache and fever, and entered hospital three days later. His arms and legs were then the seat of nodosities and erythematous thickenings like those seen in multiform erythema. The elbows and ankles were painful and tender to pressure. The spleen was normal; slight enlargement of cervical lymphatics; no tremors. Twenty days later the joint pains and erythema had disappeared. He had had four sharp rises of temperature separated by three days apyrexia. There was intense headache, chiefly frontal and supra-orbital. These symptoms persisted till three weeks later others were noted—apathy, torpor, mutism, headache, great emaciation, deep-seated headache, asthenia; the liver became enlarged. Six weeks after admission his state was serious; his mind was clouded, the respiration of Cheyne-Stokes character. Three days later a trypanosome was found in the blood. A series of injections of neosalvarsan was given. A fortnight later his condition was greatly improved and in April he rejoined the army.

The authors believe the trypanosome to be *T. gambiense* and will later give information as to its characters.

[There is no evidence that this patient ever visited a tsetse fly area; Timimounn appears to be at 29° N. The long period of apparent good health between the quitting of Africa and the onset of the illness, as well as the character of this, rather suggests that he became infected in France, though there is no instance known of infection contracted outside Africa except in a laboratory. One is reminded also of the cases described by NEPVEU (1891 and 1898) from Algeria, which are generally discredited*.] A. G. B.

*[NEPVEU studied a hundred and fifty malarial patients at Douéra, a few miles from Algiers, in 1888 and 1890. In a paper published in 1891 he describes the "Blood parasites" met with in them, which he classifies as "algues inférieures et schizomycètes" and "infusoires flagellés et sporozoaires." Thirty-four objects are figured. In 1898, referring to this study, he says that trypanosomes were found in six of over 200 patients, most of them with malaria; in one instance there were two flagella at one extremity of the organism. Had these bodies been trypanosomes, it is hardly credible that they should not have been met with in the last twenty-five years, during the latter half at least of which so much attention has been given to blood examination.]

AUBERT (P.). **Sur deux cas de Trypanosomiase observée chez des Européens au Congo Français.**—*Bull. Soc. Path. Exot.* 1915. June. Vol. 8. No. 6. pp. 372–377.

As a rule sleeping sickness in Europeans can be diagnosed without difficulty. Between 1906 and the present time this disease has been recognized in 67 Europeans at Brazzaville; of these 65 had clinical symptoms which could hardly be misinterpreted, and the diagnosis was confirmed by the discovery of trypanosomes. In this paper there is given an account of the two cases in which a firm diagnosis was difficult.

Observation 1. Doctor B., who was attached to the Pasteur Institute at Brazzaville, reached the colony in January 1913. In September he complained of great lassitude and examined his blood several times; no parasites were found, but there was marked autoagglutination. The blood was centrifuged on two occasions without trypanosomes being found. He then received about forty injections of cacodylate of soda and by the 30th September felt fit again. In December the blood was centrifuged again but nothing found. In February 1914 the lassitude reappeared and was extreme; there was loss of weight and tachycardia. February 12th to 22nd, there was headache and nausea and rise of temperature in the evening. February 22nd some enlarged but not puncturable cervical glands were found, and Kerandel's sign was noted on the inner ankles; a clinical diagnosis of trypanosomiasis was made. On the 23rd the blood was centrifuged without result and 30 cgm. atoxyl was injected; all symptoms disappeared except Kerandel's sign. 28th, reappearance of the symptoms. March 2nd, fresh injection of atoxyl, 50 cgm.; three hours later there was a violent chill with rise of temperature. On the 10th the blood was centrifuged again and numerous trypanosomes were found.

Observation 2. D. entered the Colonial Service in 1903. His fourth tour of service in French West Africa lasted from October 1910 to January 1913. At the end of 1910, shortly after a canoe journey on the Ogowe river, a small violet coloured swelling was noticed between the extensor tendons of the thumb. Some time afterwards two glands were noticed, one under the jaw, the other above the clavicle. Gland puncture was done with a negative result. The patient received some injections of arrhenal and did not return to France till January 1913. There he had generalised pruritis and, later, a spotty eruption on his skin. His fifth tour was from July 1913 to May 1914. In January 1914 he had fever for three days, the cervical glands increased in size. May 1914, rare trypanosomes were found in the blood as well as in the gland juice. The patient was sent to Libreville, where repeated examinations of his blood (with and without centrifugation) and gland juice were negative. From June to September 1914 he was under observation at Brazzaville; his only symptoms at that time were enlarged cervical glands and some rose coloured spots on the left leg. No trypanosomes could be found in the glands or blood with or without centrifugation. In June 1914 a patas monkey was inoculated and, this failing to become infected, in August a second. Ten days later rare trypanosomes were found in the first patas. Some of its blood was inoculated into a young baboon, which showed trypanosomes at intervals for two months. The other patas monkey was not infected 130 days later.

The author remarks that Dr. B.'s infection was due to accidental contamination in the laboratory, probably owing to the deposit of virulent fluids on skin presenting slight lesions. There was no local reaction where the virus entered. He thinks that Kerandel's sign has great value in diagnosis; it has rarely failed to appear in the European cases he has seen. The rarity of parasites in the circulating blood of each patient he attributes to the arsenical treatment. With

regard to the sensitiveness of *Cercopithecus patas* he notes that though one of these animals served to clinch the diagnosis, the other failed to become infected. The injection of atoxyl into healthy persons does not cause any rise of temperature ; hence the value of the " test reaction with atoxyl," which gave the required information in the case of B. It is noted that the trypanosomes became very numerous after the second injection, which was a small one ; this seems to show that it is preferable to give large doses at the beginning of treatment. With regard to the infection of the baboon, baboons being almost refractory to *T. gambiense*, the question is asked whether this was a *gambiense* infection. The virus has been sent to MESNIL with a view to its determination.

A. G. B.

TUTTLE (Howard K.). **African Trypanosomiasis. Report of a Case.** —*Jl. Amer. Med. Assoc.* 1915. July 17. Vol. 65. No. 3. pp. 240–241.

The case was that of a negro who was admitted to the Massachusetts State Infirmary in October 1914. Two years before he had left his native place, the Cape Verde Islands, for Portuguese Guinea where he remained a year and a half. He landed in the United States in April 1914. He was at a late stage of the disease with marked weakness and somnolence. Trypanosomes were found after centrifugation of 30 cc. of spinal fluid. Death occurred in January 1915. Had a Portuguese interpreter not been available, the author says, the case would have been diagnosed as general paralysis, cerebrospinal syphilis or pellagra.

A. G. B.

YORKE (Warrington) & BLACKLOCK (B.). **Notes on the Bionomics of *Glossina palpalis* in Sierra Leone, with Special Reference to its Pupal Habitats.** [Being the First Report of the Thirty-second Expedition of the Liverpool School of Tropical Medicine, 1914–1915.]—*Ann. Trop. Med. & Parasit.* 1915. July 31. Vol. 9. No. 3. pp. 349–362. With 7 plates & a map.

The scene of the researches detailed in this paper was the Cape Lighthouse Peninsula, at the mouth of the Sierra Leone river, shown on a large scale map. This is a triangular piece of ground bounded by Aberdeen Creek on one side and by the sea on the two others and attached by a long narrow neck of land. Its area is about three quarters of a square mile. There is a dense growth of mangroves on the Creek side. Oil palms are found all over the peninsula, in certain places exclusively, the dense undergrowth being formed by young palms. There are between five and six hundred inhabitants and four hundred more at the junction with the mainland. *G. palpalis* was present in fair numbers in December and January and there the authors decided to study its bionomics.

They commenced with a search for pupae, and in the first place examined, the hollow trunk of a baobab tree (photograph), eighteen empty puparia were found. The tree was at least 100 yards from the sea and a quarter of a mile from the nearest fresh water. Other likely places were searched with little success and the authors decided

to examine the oil palms. It is difficult to approach the trunk of an oil palm which has its lower petioles still unremoved; these are spiny, stick out horizontally, and form an impenetrable barrier. A tree was chosen at random and the petioles one by one cut off. Twenty pupal shells were then found beneath. They lay in dense shade not only of this palm but of surrounding ones. The search was facilitated by the use of a newspaper on which the debris was placed by shovelfulls. Other palms were then examined in a similar way and from ten to seventy-five puparia were found in each of such situations. The majority were on or close to the surface. Of twenty palms examined consecutively pupae were found beneath all but two. Though careful search was made, they found but one specimen in the angles which the petioles make with the trunk though these were filled with debris and appeared to be suitable. Out of a total of 450 puparia only twenty were unhatched.

It is popularly supposed that there is some connection between mangrove swamps and *G. palpalis*, which is locally known as the mangrove fly. The mangroves were therefore carefully examined both at high and low water. The fly was found as far as the outermost fringe, at least half a mile from dry land. The mangroves afford fairly good shade and paths are cut through them to the fishing grounds beyond. A careful search was made for pupae in the sandy mud among the mangroves and on the trees themselves; none were found and it is noted that the mangroves afford very few places for the lodgement of pupae. Immediately above high water mark pupae were found in numbers below oil palms. An experiment performed by the authors tends to show that pupae deposited on ground covered by sea water for a portion of each day would not hatch.

The authors note that fly and pupae are distributed evenly over the peninsula and are not limited to the neighbourhood of water as in Uganda, and that there are no previous records of pupae being found except "on the water's edge." [The greatest distance recorded hitherto appears to be 45 yards from water.] By far the majority of the puparia found were within one foot of a tree trunk. The authors are convinced that it is the presence of the lower petioles that renders young oil palms such excellent breeding places. They suggest that the removal of these would destroy the breeding grounds and not damage the trees; in old palms the lower petioles are absent. They advocate such an experiment on this peninsula. Their conclusions are as follows:—

"1. The breeding grounds of *Glossina palpalis* are not so strictly limited to the immediate vicinity of water as has hitherto been thought; they may occur quite independently of fresh water and at least a quarter of a mile from sea water.

"2. Although *Glossina palpalis* is to be found in considerable numbers in mangrove swamps and may travel in these to a distance of at least half a mile from dry land, the swamps do not constitute a breeding ground of the fly.

"3. The pupae of *Glossina palpalis* do not hatch when subjected to daily flotation on sea water.

"4. The ground around the trunk of oil palms (*Eloeis guineensis*) which have not been stripped of their lower petioles constitutes an excellent breeding place for *Glossina palpalis*.

"5. *Glossina palpalis* can breed in localities in which practically the only tree is the oil palm.

"6. Stripping the oil palm of the lower petioles would suffice to destroy the breeding ground in such localities."

Photographs of oil palms and of mangrove swamp illustrate the report.

[In 1909 the reviewer reported the finding in 1907 of 31 pupae under the wild date palm in Uganda.* Attention was drawn to this in the *Sleeping Sickness Bulletin.* "In one instance [pupae] were obtained about the base of a palm, and this is probably a common situation in regions where palms are of frequent occurrence." (Vol. 1, p. 91.) Again in Vol. 1, p. 401, apropos of the finding of pupae by ZUPITZA in the leaf sheaths of oil palms :—" Seeing that this plant is extensively cultivated on the West Coast of Africa its real importance as a breeding ground of *palpalis* should be ascertained. The pupae might be found between the old leaf sheaths and the stem or amongst the debris of fronds on the ground." Stripping of the old leaf bases was suggested by ZUPITZA. The subject was again referred to in Vol. 2, pp. 45 and 109. It is curious that confirmation of these observations and suggestions has been so long deferred.]

A. G. B.

YORKE (Warrington) & BLACKLOCK (B.). **Food of *Glossina palpalis* in the Cape Lighthouse Peninsula, Sierra Leone.** [Being the Second Report of the Thirty-second Expedition of the Liverpool School of Tropical Medicine, 1914–1915.]—*Ann. Trop. Med. & Parasit.* 1915. July 31. Vol. 9. No. 3. pp. 363–380.

Practically all the recorded observations indicate that for the continued existence of *G. palpalis* vertebrate blood is necessary. The authors dissected 200 flies in the manner described by LLOYD [*Sleeping Sickness Bulletin,* Vol. 4, p. 235]. The gut contents were examined fresh between a slide and coverslip. Recognisable red blood corpuscles were seen in 16, in 14 cases mammalian and in 2 non-mammalian. The mammalian red cells were of the large type and not the small variety found in sheep and goats. The authors say that the source of nucleated blood corpuscles on this peninsula is apparently much larger than that of non-nucleated, but it is stated that no flies were captured more than a quarter of a mile from human habitation. To obtain data of the length of time red blood cells can be recognised in a tsetse, freshly caught flies were fed on rat and fowl and dissected at varying intervals. The results are given in tables.

As to the question whether tsetse fly take up other food than blood, STUHLMANN, DEGEN and TAUTE are quoted in the negative sense, MAUGHAM and CARPENTER in the positive, the latter as affording good evidence. The rest of the paper is an outcome of the work done by RODHAIN and his collaborators, using vessels covered with rat skin [see this *Bulletin,* Vol. 1, p. 124, and Vol. 2, p. 571]. An experiment in which fluids stained with neutral red or methylene blue were submitted in Petri dishes to hungry flies was negative, a conclusive result

*Observations relating to the Transmission of Sleeping Sickness in Uganda ; the Distribution and Bionomics of Glossina Palpalis ; and to Clearing Measures. By Aubrey D. P. HODGES, M.D., Lond., 1909. London : Sleeping Sickness Bureau, p. 18.

as these dyes stain the tissues deeply if taken up. In the other experiments a membrane was employed.

"The apparatus used by us was a slight modification of that figured and described by Rodhain. It consisted of a short glass cylinder about three-quarters of an inch in diameter, the lower end of which was closed by a cork through which the shorter limb of a U-shaped piece of glass tubing passed; the upper end of the cylinder was covered by the membrane. The pressure of the fluid in the cylinder was indicated by its level in the longer limb of the glass tube."

Flies were first fed through fresh rat's skin on defibrinated blood, on which they gorged themselves completely whether the blood pressure was positive or negative. The blood was then diluted with salt solution and 50, 25 and 10 per cent. solutions were equally well taken, but 5 per cent. less well. Fresh defibrinated goat blood was now centrifuged, the red cells were separated from the plasma and a 50 per cent. suspension made in salt solution—a concentration approximate to that found in blood. *G. palpalis* engorged itself readily on this and on dilutions thereof down to 10 per cent. Fresh defibrinated plasma was well taken by two only out of eight. It was concluded that the attractive part of the blood is the red corpuscle. Washed red cells were now laked; three *palpalis* quickly engorged themselves upon the solution. An attempt was made to separate the stromata from the soluble portion of the corpuscle, without complete success owing to want of suitable apparatus; the solution was well taken and a solution made from the crystalline haemoglobin of commerce was taken to some extent.

Various other solutions, in each case coloured with methylene blue, neutral red or fuchsin, were now offered to *G. palpalis* through a skin membrane, e.g. physiological saline, sugar solution, glycerin. All were taken up to some extent, as evidenced by the staining. Three flies became completely engorged with 0·9 per cent. sodium chloride solution to which had been added about 5 per cent. of cane sugar and a little neutral red. It was found that the fly would feed through sheep's bladder and peritoneal tissue and would plunge the proboscis through and, rarely, imbibe fluid through a thin sheet of rubber; perhaps this tended to occlude the lumen of the proboscis.

These experiments show that under favourable conditions Glossina will take up solutions of vegetable origin, such as sugar and water, provided that the fluid is enclosed in a membrane. The physical character of the fluid does not, within limits, appear to matter. Does Glossina take up vegetable juices in nature? The authors had no opportunity of deciding the point. They noticed that *palpalis* will pierce leaves placed on the surface of a liquid.

Conclusions:—

"1. About eight per cent. of the wild *G. palpalis* in this district contain recognisable red blood cells—seven per cent. of mammalian origin and one per cent. nucleated red cells of unknown origin.

"2. Seventy-two hours after *G. palpalis* had completely distended itself on rat's blood recognisable red cells could no longer be found in its intestine; after being fed on a fowl nucleated red blood cells could be recognised in 40 per cent. of cases at the end of a similar period. The flies were kept at a temperature of 80°–86° F.

"3. Neither shed blood nor other fluid which is exposed (not covered by a membrane) can be imbibed by *G. palpalis*.

"4. *G. palpalis* can take up through a membrane of fresh skin not only blood and various dilutions of it with normal saline, but also suspensions of red blood cells in normal saline, and solutions of haemoglobin (both freshly made from red blood cells, and the dried crystalline preparation of commerce) in distilled water.

"5. Fluids other than blood such as solutions of sugar, sodium chloride, and glycerine, in water containing a small quantity of a dye (methylene blue, neutral red or fuchsin) are also taken up through a membrane of fresh skin by *G. palpalis*, but not so quickly or so readily as is blood.

"6. *G. palpalis* exhibits a definite selective taste for the various fluids presented to it under the membrane; blood, red cells, and haemoglobin solution being much preferred. The attractive element in the blood is the fraction of the red cells soluble in water, probably haemoglobin.

"7. *G. palpalis* which had been starved for a day or two can often be seen to insert the proboscis repeatedly into oranges, bananas or other fruits which may be offered them.

"8. We are of opinion that *G. palpalis* in nature may under certain conditions take up fluid other than blood."

A. G. B.

BEQUAERT (J.). **Notes sur la dispersion des Glossines au Congo belge.** —*Bull. Soc. Path. Exot.* 1915. July. Vol. 8. No. 7. pp. 463–467.

The notes recorded in this paper were made during a recent journey in the eastern part of the basin of the Congo. They chiefly concern *Glossina palpalis*. On board a Congo steamer the author saw a small jumping spider (Dolomedes sp. ?) which had captured a tsetse. On one of the islands in the river he saw a dragon fly resting on the sand holding a *palpalis* between its mandibles; he notes that this observation had previously been made by CARPENTER in Uganda. He found *Glossina palpalis* to the south of the Albert Edward Lake, but never at a height above 1,200 to 1,250 metres. He notes that ROUBAUD has recently reported from the collections of the Paris Museum several specimens of *G. palpalis* var. *fuscipes* supposed to have been collected by CRONIER in the volcanoes of Kivu between 1,500 and 3,000 metres. He questions whether this is correct and suggests that it is due to an error of labelling. He does not think that *palpalis* exists on the banks of Lake Kivu, which is 1,460 metres. He notes that in his experience, as in that of others, in places frequented by man males and females of *palpalis* are caught in approximately equal number, whereas males predominate in catches in uninhabited places, and gives figures in support of this.

In the discussion which followed, ROUBAUD did not accept the author's view as to the Kivu specimens. He thought that one should be very cautious in affirming the absence of *palpalis* owing to its large seasonal migrations. He had noted that at one inhabited area which he examined females were much more numerous than males in August, whereas the relation was reversed in October, which is against Bequaert's generalisation.

A. G. B.

YORKE (Warrington) & BLACKLOCK (B.). **Notes on Certain Animal Parasites of Domestic Stock in Sierra Leone.** [Being the Fourth Report of the Thirty-second Expedition of the Liverpool School of Tropical Medicine, 1914–15].—*Ann. Trop. Med. & Parasit.* 1915. July 31. Vol. 9. No. 3. pp. 413–420.

A serious outbreak among cattle having occurred, the authors proceeded to Batkanu to investigate it. The cattle had been brought

originally from French Senegal, and were nearly all bullocks. The disease appeared towards the end of the rainy season when *Stomoxys nigra* was plentiful. The authors did not see the animals until the epizoötic had ceased. Trypanosomes and piroplasmata were found in their blood, and in the blood of other domestic animals in Sierra Leone.

Trypanosomes were found in 19 cattle out of a total of 143. Some of these were examined in Freetown. In the infected animals, *T. congolense* was found 11 times, *T. vivax* twice, a double infection of *T. congolense* and *T. vivax* five times, and *T. gambiense* once.

A rat sub-inoculated from a dog showed *T. congolense* in its blood, though the parasite was not seen in the dog.

Four hundred wild *Glossina palpalis*, caught on Cape Lighthouse Peninsula, were dissected; trypanosomes were found in 21 of them. The salivary glands of the Glossinae were not parasitised, only the proboscis in 15 cases and the gut in two, while both gut and proboscis were found to be parasitised in 4 cases.

Piroplasma bigeminum occurred in about 5 per cent. of the cattle examined. *Theileria mutans* occurred in 20 to 30 per cent. of the cattle; the parasites did not appear to produce any symptoms of disease. Koch's "blue bodies" were not found.

Ticks collected from 90 cattle at Batkanu were *Boophilus australis* and *Amblyomma variegatum*, the former being the most numerous.

The authors' conclusions are:—

"1. Cattle are not bred to any extent in the Colony of Sierra Leone or in most parts of the Protectorate. Bullocks are, however, imported from French Senegal in considerable numbers, and gradually find their way down to Freetown for slaughter.

"2. Serious outbreaks of disease in the form of epidemics occur amongst the cattle of Sierra Leone.

"3. These epidemics have been attributed to various causes, but their real nature is still obscure.

"4. Trypanosomiasis of cattle is common. Of the thirty-four animals examined at the slaughter-house in Freetown, fourteen (41 per cent.) were found to be infected. As only a single blood film was examined, the real percentage of infections is certainly much higher.

"5. *T. congolense* and *T. vivax* are the parasites most commonly found. *T. gambiense* was met with once.

"6. About 5 per cent. of the animals examined were found to be infected with *Piroplasma bigeminum*.

"7. *Theileria mutans* was encountered in between 20 and 30 per cent. of the cattle examined."

H. B. Fantham.

SERGENT (Edm.), LHÉRITIER (A.) & BELLEVAL (G.). **Sur le *Trypanosoma marocanum*, n. sp., agent d'une épizootie équine à Casablanca en 1911.**—*Bull. Soc. Path. Exot.* 1915. July. Vol. 8. No. 7. pp. 433–438.

In the year 1911 one of the authors noticed this disease amongst horses at Casablanca, Morocco. A trypanosome was found in the blood. The systematic study of the virus was begun in 1912 and is only lately concluded. In the interim VELU has reported trypanosomiasis amongst horses in the district of Fez [see this *Bulletin*, Vol. 5, p. 414]. The clinical accounts of the disease have unfortunately been lost. The trypanosome as seen in the blood of guinea-pigs is

18μ long (maximum 24, minimum 16μ (and 1·5 to 2·5μ broad. The results of a few animal inoculations are given. It is concluded that the morphological and experimental study of this trypanosome does not show any difference between it and the most wide-spread trypanosome of North Africa—*Trypanosoma berberum*, the cause of debab.

They went on to experiments of crossed immunity with this trypanosome, *T. berberum*, *T. equiperdum*, and *T. soudanense*. These are detailed. They showed in the first place that the Casablanca virus differs from that of debab and the Sudanese Tahaga; a camel and two goats immunised towards *T. berberum* and *T. soudanense* contracted the Casablanca virus. On the other hand, a goat immunised against the Casablanca virus became infected with *T. berberum*. They showed also that the Casablanca virus differs from that of dourine; for a camel and a goat immunised towards the Casablanca virus became infected with *T. equiperdum*. This trypanosome therefore is regarded as a new species, for which the name *T. marocanum* is proposed.

A. G. B.

Fiori (C.) & Delanoë (M. et Mme.). **Sur un cas de trypanosomiase constaté chez un cheval à Mazagan. Note préliminaire.**—*Bull. Soc. Path. Exot.* 1915. July. Vol. 8. No. 7. pp. 503–515. With 1 chart & 1 plate.

The horse in question was received into the veterinary infirmary at Mazagan, Morocco, in February 1915. It is believed to have contracted its infection at Mazagan. A detailed account is given of the physical signs and symptoms, illustrated by a chart. Trypanosomes were seen on four different occasions during April and May. Inoculations were made into white rats, white mice, dogs, rabbits and a sheep. These experiments are summed up in a table.

The trypanosome is described in the fresh state and stained by Pappenheim's process. A plate shows trypanosomes in the horse's blood and in the blood of a dog and a rat. It is noted that posterior nuclei were never seen. Seven per cent. of the parasites in smears of the horse's blood had no free flagellum; the trypanosome therefore is regarded as dimorphic, but it is said that the dimorphism is much less marked than that met with in *T. pecaudi* Laveran. Various measurements of 52 trypanosomes are given in a table. The average length was 26·3μ (minimum 16·8, maximum 33·5μ). The free flagellum averaged 4·6μ. The average width of the trypanosome was 3·2μ. Another table shows the measurements of 36 trypanosomes from the blood of the rat. It is seen that they are longer in this animal, the average length being 31μ. Trypanosomes without free flagellum were met with, but in much less numbers. It is stated that they tend to become monomorphic in the rat even at the first passage and it is suggested that in successive passages those without free flagellum might disappear completely. In the rat a certain proportion of trypanosomes had no blepharoplasts, about 16·5 per cent.

The authors ask whether this trypanosome is that of debab, *T. soudanense*, var. *berbera*. The results of the animal inoculations would satisfy this diagnosis, but forms without free flagellum have not been reported in debab. They think that tests of crossed immunity are required to settle the diagnosis. They believe that the infection arose from the caravans of camels which come from Marrakesh.

A. G. B.

YAKIMOFF (W. L.). **A propos du** *Trypanosoma wrublewskyi.*—*Bull. Soc. Path. Exot.* 1915. July. Vol. 8. No. 7. pp. 431–433.

The author recalls that in 1907 WRUBLEWSKY discovered a flagellate in bison of Bielowiesch, which was named by WLADIMIROFF and Yakimoff *Trypanosoma wrublewskyi*, n. sp. The opinion with regard to the specificity of this organism has now been changed for the following reasons:—The discoverer of the organism did not make smears at the time that the blood was taken, but took the blood in Pasteur pipettes, kept it for 7 to 9 days, and then made smears. The serum in the pipette was thus an excellent culture medium, and WRUBLEWSKY really had obtained preparations of the cultural forms of the trypanosome. The organisms resemble cultural forms of *T. theileri*, which are crithidial. As *T. theileri* is present in cattle in the north of Russia, and the bison can be infected with a cosmopolitan trypanosome like *T. theileri*, the author suppresses the name *T. wrublewskyi* in favour of *T. theileri*, which is considered to be non-pathogenic. H. B. F.

COLES (Alfred C.). **Multiplication-Forms of** *Trypanosoma lewisi* **in the Body of the Rat.**—*Parasitology.* 1915. Sept. 20. Vol. 8. No. 2. pp. 184–189. With 2 plates.

The trypanosome, *T. lewisi*, was examined in dead rats (*Mus decumanus*) obtained near Bournemouth during the last ten years. Coiled up trypanosomes were seen occasionally in smears of the lungs, also apparently encysted forms in the liver. The author then briefly describes what he calls "minute trypanosomes," which are really leishmaniform stages and were found in the lungs of three rats. [Compare the rounded, non-flagellate stages of other trypanosomes]. CARINI'S pneumocysts were also found in the lungs [but the accompanying photomicrographs of these structures, unfortunately, are not very convincing]. Multiplication cysts of *T. lewisi* were found in the heart blood and lungs on two occasions; these cysts are spherical, 14μ to 18μ in diameter, and contain many nuclei and blepharoplasts. It is also claimed that "in the lung and heart blood of naturally infected rats many of the stages which MINCHIN and THOMSON (1915) have described and illustrated in their . . . . . work on the stages of *T. lewisi* in the rat flea" were found.

Trypanosomes in actual binary fission were only seen in young rats. Crithidial forms were found in heart and lung blood. The paper is illustrated by 34 small photomicrographs.

[Most of the stages of *T. lewisi* recorded by the author were described and figured by MOORE, BREINL and HINDLE in 1908 in the *Annals of Tropical Medicine and Parasitology*, Vol. 2, pp. 197–220, 4 plates.]

H. B. F.

HOFFMANN (George L.). **Chemotherapeutische Studien über die intravenöse Verwendung von Antimontrioxyd bei experimentellen Trypanosomeninfektionen.** [The Intravenous Employment of Antimony Trioxide in Experimental Infections.]—*Zeitschr. f. Hyg. u. Infektionskr.* 1915. Aug. 18. Vol. 80. No. 2. pp. 261–279.

The author gives an historical account of the use of antimony and its salts in trypanosome infections down to the work of KOLLE,

HARTOCH, ROTHERMUNDT and SCHUERMANN [this *Bulletin*, Vol. 2, pp. 134 and 351; Vol. 3, p. 247], who first employed the trioxide. They demonstrated that for an antimonial compound to be therapeutically effective the antimony must be in trivalent form. Whereas in all other substances tried toxicity increased with trypanocidal activity, the trioxide proved to be almost non-toxic for laboratory animals. They gave it by intramuscular injection to small animals, intravenously in very fine suspension to larger laboratory animals, with success. YORKE and BLACKLOCK have reported on their trial of the drug [*loc. cit.* Vol. 3, p. 532]. They used it intramuscularly and intravenously; in the latter form it tended to deposit from the saline solution in which it was suspended.

The author tried to improve the means of suspension. He used rabbits infected with nagana and dourine, and did not intervene till clinical signs were marked. The suspending media were sugar solutions, gum arabic solutions, and mixtures of these. Best was a 7·5 per cent. solution of gum arabic in the Syrupus simplex of the Swiss Pharmacopoeia.

The technique of making the suspension is described. It proved more toxic than that used by KOLLE and his co-workers. The protocols follow. Five rabbits had a single injection from a fortnight to six weeks after inoculation with nagana; their blood was tested once a month by inoculation into mice and was negative three to four months later. The dose, 45 mgm. per kilo body weight, was less than that employed by KOLLE. Similar results were obtained in eight rabbits infected with dourine. The chemotherapeutic index, that is, relation of therapeutic to toxic dose, was in each case very low.

The author concludes that antimony trioxide given intravenously to rabbits infected with nagana and dourine brings about *Therapia sterilisans magna*; that sugar and gum arabic solutions are most suitable for suspending the drug; and that the views of KOLLE and others on the value of antimony trioxide as a curative agent are fully supported by these experiments. A. G. B.

NUTTALL (G. H. F.) & HINDLE (E.). **Experiments in the "Tryposafrol" Treatment of Trypanosomiasis (*T. brucei*) in Guinea-pigs and of Piroplasmosis in Dogs.**—*Parasitology*. 1915. Sept. 20. Vol. 8. No. 2. pp. 218–228.

The authors refer to the reports upon experiments with this drug by BRIEGER and KRAUSE [*Sleeping Sickness Bulletin*, Vol. 4, pp. 60 and 328]; they claimed to cure nagana in rats and guinea-pigs. These claims however were not substantiated by RIETZ and LEUPOLD, and in sleeping sickness no good results have been obtained (LURZ; WERNER; MOUCHET and DUBOIS). Later BRIEGER and KRAUSE stated that excellent results had been obtained in various other diseases, in such a way as to challenge criticism. The authors therefore undertook experiments with tryposafrol and novo-tryposafrol on guinea-pigs infected with *T. brucei* (strain "ferox"). There were 19 treated and 6 untreated controls. The results showed that "the two preparations of the dye were worse than useless as remedies for nagana in guinea-pigs." Similarly, novo-trypasafrol proved useless in the treatment of canine piroplasmosis. A. G. B.

KOLMER (John A.). **A Method of transmitting Known Numbers of Trypanosomes with a Note on the Numeric Relation of Trypanosomes to Infection.**—*Jl. Infect. Dis.* 1915. July. Vol. 17. No. 1. pp. 79–94. With 1 text-fig.

"Briefly, the method consists in securing a definite volume of blood in a blood corpuscle-counting pipet, and mixing it with a definite amount of a diluting fluid that hemolyses the erythrocytes, and fixes and stains the trypanosomes. The trypanosomes are then counted by means of a Thoma-Zeiss counting chamber and the number in a cubic centimeter of undiluted blood calculated. With this data at hand, 0·1 cc. of blood is drawn aseptically from the heart of the seed animal in 0·9 cc. of a 10 per cent. solution of sodium citrate in normal salt solution. With this blood, dilutions are made in warm, sterile, normal salt solution until a cubic centimeter or a fraction thereof contains the required dilution and number of trypanosomes determined upon for the purpose of infecting a series of rats, or for any other purpose."

The diluting fluid is :—

Formalin (40 per cent.)	2 cc.
Glacial acetic acid	2 cc.
Distilled water	96 cc.

Mix and add 2 cc. carbolfuchsin (Ziehl-Neelson); mix again and filter through paper.

Trypanosoma lewisi, *T. equiperdum* and *T. brucei* were used, and full protocols are given.

The conclusions are :—

"A method is described which has been found simple, fairly accurate, and very useful for transmitting approximately known numbers of trypanosomes to normal rats under sterile conditions and without injury to the seed animal.

"By this method, several series of rats have been infected with increasing numbers of *Trypanosoma lewisi*, *T. equiperdum*, and *T. brucei*, and a study made of the minimal number of trypanosomes in each species necessary for infection, as well as the time of true incubation and duration of life. Well-defined quantitative relations were found with *T. brucei*, less with *T. equiperdum*, and least with *T. lewisi*.

"The injection of small numbers of pathogenic trypanosomes lengthens the period of incubation and, in this manner, the duration of life, as dating from the time of infection; but when the parasites once appear in the peripheral blood, the duration of life is about the same, regardless of whether the animal was originally infected with a large or a small number."

H. B. F.

WOLBACH (S. B.), CHAPMAN (W. H.) & STEVENS (H.W.). **Concerning the Filterability of Trypanosomes.**—*Jl. Med. Research.* 1915. Sept. Vol. 33. No. 1. pp. 107–117.

It is recalled that NOVY and MACNEAL in 1906 reported that in cultures of *Trypanosoma lewisi* the smallest forms which developed would pass through Berkefeld filters. BRUCE and BATEMAN (1908), testing this possibility with regard to *T. brucei* and *T. evansi*, obtained negative results. Further, in 1911 BRUCE and colleagues found that there were no filterable stages of *T. gambiense* in *Glossina palpalis*.

The authors' experiments were begun and abandoned in 1912, the results being negative. They were resumed, however, in 1915, when it was confirmed that *Spirochaeta duttoni* would pass through Berkefeld filters.

Twenty-four experiments were made, six with the blood and organ juices of animals infected with *T. brucei*, two with *T. gambiense*, and the remainder with *T. lewisi*. In the case of the last-mentioned trypanosome, cultures were sometimes used, the cultures being grown on a modified Novy-MacNeal-Nicolle medium, to which veal infusion and dextrose had been added. The blood or ground-up organs were first filtered through a Büchner filter to remove shreds of tissue and a part of the blood corpuscles. A control bacterium (e.g., *Bacillus prodigiosus*) was added to the Büchner filtrate.

Protocols of the 24 experiments are given. The results were negative. The authors conclude that "trypanosomes from cultures and from animal tissues are not filterable through bacteria-proof filters."

H. B. F.

LAVERAN (A.). **Au sujet d'un *Trypanosoma gambiense* qui, conservé depuis 12 ans chez des animaux, est resté résistant au sérum humain.**—*Bull. Soc. Path. Exot.* 1915. July. Vol. 8. No. 7. pp. 442–446.

The author showed in 1904 that normal human serum that was active both preventively and curatively on the viruses of animal trypanosomiases was without action on *T. gambiense*. Later he found that a strain kept in his laboratory for nine years had not become susceptible. MESNIL and RINGENBACH however have shown that a strain of *T. gambiense* maintained in the laboratory for seven years evinced a certain susceptibility [*Sleeping Sickness Bulletin*, Vol. 4, p. 279; this *Bulletin*, Vol. 5, p. 97]. Hence the fresh experiments with Laveran's strain, which had been kept up almost exclusively in guinea-pigs.

Four guinea-pigs were inoculated with virulent blood mixed with half or one cubic centimeter of human serum; two controls received the blood inoculations only. All the four became infected; two behaved like the controls as regards the incubation period and duration of infection; in one case there was a delay in the appearance of trypanosomes and a longer duration of the disease; in the fourth case the disease lasted very long (still in progress), but Laveran notes that recent infections with this virus have dragged on a long time (nine months in one case).

The experiments show that the sero-resistance of *T. gambiense* has changed very little at the end of twelve years, and demonstrate again that in this regard *T. gambiense* behaves quite differently to *T. rhodesiense*.

A. G. B.

LANFRANCHI (A.). **Sur le passage des Trypanosomes dans le lait.**—*Bull. Soc. Path. Exot.* 1915. July. Vol. 8. No. 7. pp. 438–442.

The researches of BRUCE and others have shown that many species of trypanosome can pass through healthy mucous membrane. The

author sought to ascertain if they can pass into the milk. He experimented with *T. brucei*, *T. evansi*, *T. rhodesiense* and *T. gambiense*, obtaining the strains from MESNIL. His object was to ascertain (*a*) if new-born animals fed at the breast would contract infection; (*b*) if it is possible to demonstrate trypanosomes by direct examination of the milk; (*c*) if the milk is infective when inoculated direct into the peritoneum of rats and mice. The experiments are described.

In the case of *T. gambiense*, seven puppies were born on the 23rd June and left at the breast. On the 24th the mother was inoculated and on the 30th showed a few trypanosomes, which on July 4th were numerous.

Results obtained: —

(*a*) Three of the puppies died and their blood was infective to mice.
(*b*) The microscopic examination of the milk was negative.
(*c*) A mouse inoculated with milk on the 4th July showed trypanosomes nine days later.

Similar results were obtained with *T. brucei*. In the case of *T. rhodesiense* experiments (*a*) and (*b*) were negative; one animal became infected under (*c*). In the case of *T. evansi* all the results were negative.

It is noted that TERRY has shown that only half of the rats inoculated with nagana and other viruses by way of the stomach contracted infection. Lanfranchi anticipates the objection that there may have been slight lesions of the nipple so that the puppies were infected directly from the blood, by pointing out that that would not explain the results obtained under (*c*). He also notes that the milk was never infective during trypanolytic crises. He concludes by affirming that the passage into the milk of *T. brucei*, *T. rhodesiense* and *T. gambiense* is possible and animals infected with *T. brucei* and *T. gambiense* can infect their young by suckling them.

A. G. B.

WATSON (E. A.). **Dourine and the Complement Fixation Test.**—*Parasitology.* 1915. Sept. 20. Vol. 8. No. 2. pp. 156–183.

This paper is highly technical and its scope only can be indicated here. The author writes from an experience of 15,000 tests for dourine made at the Veterinary Research Laboratory, Lethbridge; the complement fixation reaction "has been thoroughly established as a sure, safe, and specific method of diagnosing dourine." It has been adopted as the official test in Canada. Only by its application can healthy looking carriers of the disease be detected. Most of the paper deals with technique and procedure, under the headings Preparation of Reagents, Titration of Reagents, Serum to be tested. As to the test itself two alternative methods of procedure are advised according as one or several tests have to be made, or for daily routine testing on a large scale. The author then deals with certain objections to the employment of the test, which he meets.

"Experience indicates that 100 per cent. of dourine infected animals, whether in active or latent stages of disease, give positive serum reactions, provided that an interval of two to three months has been allowed for an incubation period in the more or less resistant animals, less than one month being sufficient in most cases."

Comparing this test for dourine with the Wassermann test for syphilis the author says that the latter is greatly inferior whether in delicacy, specificity or trustworthiness. He adds that no one should attempt to apply the test who has not thoroughly mastered the technique and gained complete control of the reagents.

A. G. B.

i. NEIVA (Arthur). **Presença em uma localidade do Estado do Rio de um novo transmissor da "Molestia de Chagas" encontrado infectado em condições naturaes. (Nota prévia.)** [Occurrence in a Locality in the State of Rio of a New Carrier of Chagas's Disease found Infected under Natural Conditions.]—*Brazil Med.* 1914. Sept. 15. Vol. 28. No. 35. pp. 333–335.

ii. **Contribuição para o conhecimento dos hemipteros hematophagos da America Central. (Nota prévia.)** [A Contribution to our Knowledge of the Blood-sucking Hemiptera of Central America.]—*Ibid.* 1915. Jan. 1. Vol. 29. No. 1. pp. 1–3.

i. The author announces the discovery of a new carrier for Chagas's disease in *Triatoma vitticeps* (Stal), a specimen of which was found naturally infected with *Trypanosoma cruzi* in the vicinity of Rio. The species in question is so large, being 35 millimetres in length by 15 in breadth, that it has not been suspected hitherto of being a blood-sucker of human beings. Practically nothing is known of the biology of this species of Triatoma, which is rare in museums. Flagellates in the form of Crithidia were found in the alimentary canal of the captured specimen, from which three guinea-pigs were successfully inoculated. In one of these, 42 days after inoculation, *Trypanosoma cruzi* was found in the blood. The author points out, however, that it is not always possible to find trypanosomes in the peripheral blood in every case of successful inoculation, and states that the presence of Chagas's disease in a locality may be diagnosed with more certainty by the examination of the intestinal contents of the Triatomas than in any other way. He goes on to express the opinion that Chagas's disease is an infection which will be found to prevail all over Tropical America wherever species of Triatoma are found. He has received reports that infected Triatomas, of an uncertain species, have been found in the Republic of San Salvador, and he believes that even in Texas and Florida, where *Triatoma sanguisuga* is common, Chagas's disease may be found to exist.

ii. A note recording the receipt from Dr. L. E. HURTADO, of San Salvador, Central America, of specimens of *Triatoma dimidiata* (var. *maculipennis*, Stal), and *Rhodnius prolixus*, Stal. The sender of the specimens furnished the additional information that he had found specimens of *T. dimidiata* infected with crithidial forms of *Trypanosoma cruzi*, and had been able to obtain infection of guinea-pigs and rabbits therewith, after an incubation period of 25 days. In addition to *T. dimidiata* already mentioned, *T. rugulosa* occurs in Costa Rica, *T. venosa* in Costa Rica and Panama, and *T. rufotuberculata* in Panama.

J. B. Nias.

TYPHUS.

PLOTZ (Harry), OLITSKY (Peter K.) & BAEHR (George). **The Etiology of Typhus Exanthematicus.**—*Jl. Infect. Dis.* 1915. July. Vol. 17. No 1. pp. 1–68. With 1 plate and 16 curves.

The first part of this article, on bacteriological studies, is by Plotz, who has succeeded in isolating a bacillus from the blood of both epidemic and endemic cases of typhus. Cultures were only obtained by using anaerobic methods, the most satisfactory being that of LIBORIUS-VEILLON, serum-glucose-agar being employed in place of glucose agar.

The colonies usually appear in the lower two or three centimetres of the tube, occasionally higher, but never within three centimetres of the top. The colony appears round and opaque, varying from 1 to 6 mm. in diameter and in cross section it is Y shaped, brownish in appearance and soft in consistency.

The organism is a small, pleomorphic, Gram-positive bacillus, non-motile, not encapsulated and not acid-fast. Its length varies from 0·9 to 1·93 microns, its breadth being from one-fifth to three-fifths its length. Most of the organisms are straight; occasional ones are slightly curved. Coccoid bodies also occur. The ends are rounded or slightly pointed. In smears from solid media the organisms lie irregularly, there being no definite arrangement. Degeneration and involution forms appear early, so that after repeated transplantations the organism may assume a different morphological appearance from the bacilli in the original culture.

In addition the authors give the cultural characteristics of this organism. As shown in the accompanying table it is evident that anaerobic conditions are essential to its growth.

These organisms, isolated from cases of endemic and epidemic typhus, were found to be identical with those isolated by blood culture from eight guinea-pigs and one monkey in which the disease had been produced experimentally.

The organisms were most abundant in the blood of patients on the fourth and fifth days before the crisis. The degree of bacteriaemia seems to be related to the severity of the infection, for in epidemic cases 51 cc. of blood were used and 74 colonies obtained, whilst in endemic cases 436 cc. of blood were used and only 33 colonies found.

Because of the late maturation of the colonies the results of blood cultures are usually only known after the termination of the illness and therefore this method is only of diagnostic value in confirming the clinical diagnosis. For this organism the authors propose the name of *Bacillus typhi-exanthematici.*

The second part of the article, on serological studies, is by Olitsky and contains an account of the complement fixation, agglutination, precipitation, other antibody reactions; the identity of the organism obtained from endemic typhus fever with that isolated from epidemic typhus fever; serological studies in animals, serological reactions in individuals after exposure to typhus fever, the relation between the serological results and typhus fever.

TABLE I.

Results of Cultivations in Various Media in Deep Tubes.

	Alone.	Layered with Liquid Petrolatum.	Kidney tissue.	Kidney Tissue and Liquid Petrolatum.	Ascitic Fluid.	Ascitic Fluid and Kidney Tissue.	Ascitic Fluid, Kidney Tissue, and Liquid Petrolatum.
Agar	No growth	No growth	No growth	No growth	No growth	No growth	No growth
One-half per cent. glucose agar	No growth	No growth	Slight growth	Slight growth	Growth	Growth	Growth
Two per cent. glucose agar	No growth	No growth	Slight growth	Slight growth	Growth	Growth	Growth
Sugar-free broth	No growth	No growth	No growth	No growth	No growth	No growth	No growth
Two per cent. glucose broth	Very slight growth	Slight growth	Slight growth	Slight growth	Slight growth	Slight growth	Slight growth

The results are given in detail in tabular form and show that there is a most intimate relation between the typhus bacillus and typhus fever. The serological reactions occur in an orderly manner. Complement-fixing bodies are usually not seen at the height of the disease, but are demonstrable as the crisis is attained and increase in concentration in the post critical, afebrile state; the same is true of agglutinins, as well as precipitins. These antibodies are developed in the body as the result of an antigen circulating at the height of the disease. They are demonstrated *in vitro* when the organism isolated from the blood of typhus fever patients is used as artificial antigen. Hence, but one conclusion is possible: typhus fever is a reaction against this organism.

Although these reactions occur in coincidence with the process of immunity, they are merely signs which usually appear in immunization, but are not indicators of the existence of absolute immunity.

Strong serological reactions were obtained in sixteen cases in which bacteria were not found at the height of the disease.

The third part of the article, on experimental studies, is by all three authors and the results show that a bacillus, identical with that recovered from patients with typhus fever, can also be isolated from the blood of animals in which the disease has been reproduced by inoculation of typhus blood. In such animals, the frequency of the bacilli in the blood is directly proportional to the severity of the illness. In individual animals it is greatest at the height of the disease.

Typhus blood was found to be infective only if it contained a sufficient number of the bacilli.

From all the above observations and experiments the authors consider themselves justified in concluding that this bacterium is the causative agent of typhus.

[For further details those interested should consult the original article, which contains an exhaustive account of the experiments.]

E. Hindle.

FOSTER (George B., Jr.). **Endemic Typhus Fever in the Philippine Islands. Observations based on a Study of Twenty-Three Cases occurring among Filipinos at Camp Keithley, Mindanao, P.I., with the Results of Animal Inoculations.**—*Arch. Internal Med.* 1915. Sept. 15. Vol. 16. No. 3. pp. 363–381. With 3 charts.

These twenty-three cases of typhus are the first to be recorded from the Philippines, although the disease has probably existed there for an indefinite period. The writer studied these cases and also was successful in infecting monkeys and guinea-pigs with the disease. Transmission experiments were not attempted, but everything points to lice being the transmitting agent. In this case the head louse, *P. capitis*, must be responsible, for the body louse, *P. vestimenti*, is generally stated to be absent from the Philippines.

The symptoms of the disease call for no special remarks, as they are merely those of somewhat mild attacks of typhus.

E. H.

CIAVALDINI. **Relation d'une épidemie de typhus exanthématique (mars-avril 1915).**—*Bull. Acad. Med.* 1915. Vol. 74. No. 28. pp. 63–64.

In Algeria, as a result of the impoverishment of the country caused by the present war, the poorer natives are insufficiently fed and these conditions have been accompanied by the appearance of typhus in various localities. The author describes the epidemiology of a small outbreak that occurred in his province of El-Arrouch and the means that were taken in order to stamp it out.

E. H.

KURIAZIDES (K. N.). ΚΥΡΙΑΖΙΔΟΥ (Κ. Ν.) *Περὶ τῆς ἐν Ἑλλάδι κατὰ τὸν Βαλκανοτουρκικὸν πόλεμον ἐμφανίσεως τοῦ εξανθηματικοῦ τύφου καὶ τοῦ τρόπου τῆς καταπολεμήσεως αὐτοῦ.* [On the Outbreak of Exanthematic Typhus in Greece during the Balkano-Turkish War and the Means taken to deal with it.]—„Ἀρχεῖα Ἰατρικῆς." (*Arch. de Méd.*) 1915. Apr. 1–20. Vol. 10. Nos. 10–12. pp. 105–112. With 2 figs.

An account of the means taken to combat a number of small outbreaks of typhus fever which occurred, either in camps of refugees from Thessaly, or amongst bodies of Turkish prisoners in Greece. The number of cases detected, only amounted to 60 in all, of which 11 died, giving a mortality of 23 [? 18·3] per cent.

The procedure followed was to isolate all detected cases of typhus at once, and to disinfect them from lice before taking them into hospital. With this object every patient was stripped of his clothing and given a warm bath, the hair being cut off, in the case of men, and disinfected with paraffin in the case of women. The body was then anointed all over with camphorated oil, and clean clothing put on, after which the patient was put to bed, the result being that not one of the medical men or nurses in attendance contracted the disease. The clothing taken from the patients was simultaneously sterilised in a hot oven, and one of the men employed on this work contracted typhus. A similar procedure was followed with all contacts in the camps. Every person was made to take off his clothing in an empty house, and was then washed all over with an antiseptic solution of either 1 per 1,000 perchloride or 3 per cent. carbolic, after which the body was anointed all over with camphorated oil. The clothes of the individual were meanwhile being sterilised outside the house by means of a portable steam oven, of which a figure is given, in which the garments were kept for half an hour; they were then put on again by the owner. By these means all extension of the outbreaks was prevented. Schedules of suitable instructions were at the same time distributed to all the public authorities, and in this way the whole trouble was nipped in the bud. A table showing the total number of persons involved in the different outbreaks is appended.

J. B. Nias.

SKUTETZKY (Alexander). **Die Flecktyphusepidemie im k. u. k. Kriegsgefangenenlager in Marchtrenk, Ob.-Oesterr., im Jahre 1915.** [The Typhus Epidemic in the Prisoner-of-War Camp in Marchtrenk, Upper Austria, during the Year 1915.].—*Wien. Klin. Woch.* 1915. Aug. 19. Vol. 28. No. 33. pp. 887–891. With 9 curves.

The writer was the chief physician in a large prisoner-of-war camp and he records his notes on typhus from the 8th February, 1915, when there were about 900 men in the camp up till May, during which period the number of prisoners increased to 8,000 or more. Typhus broke out in the camp during February, attaining its maximum on February 24th when there were 40 fresh cases. After this the number of new cases diminished but there was always a recrudescence of the disease after each influx of new prisoners. The new cases were always amongst the fresh arrivals and never appeared after the 16th day, from which the author concludes that the incubation period practically never exceeds 16 days.

The patients were carefully freed from body lice on entering the camp and by this means the typhus was prevented from spreading and no cases occurred amongst the hospital staff. From his experiences the author is of the opinion that the body-louse is solely responsible for the transmission of typhus.

The manner in which the disease was restricted to each crop of new arrivals showed that the disease was not endemic in the camp, but was reintroduced with each consignment of prisoners, who were infested with lice.

Interesting curves are given showing the prevalence of typhus in the camp and the way it disappeared after destroying all body lice.

E. H.

BORAL (H.). **Zur Differentialdiagnostik und Prophylaxe des Flecktyphus.** [The Differential Diagnosis and Prophylaxis of Typhus.] —*Wien. Klin. Woch.* 1915. June 17. Vol. 28. No. 24. pp. 641–645. With 7 curves.

The writer finds that certain cases of typhoid may show a typical typhus exanthem and cases of typhus occur associated with typical typhoid symptoms. In the early stages it is impossible to distinguish the two diseases with any certainty by clinical methods, and the only means of obtaining a correct differentiation between typhoid and typhus is by means of a serological and bacteriological examination of the blood.

Typhus in not infectious during the incubation period and lice that feed on a patient at this stage of the disease do not become infective.

In the initial stages of typhus and also when the exanthem is well developed there is little danger of the disease spreading in the absence of lice, but the author considers that fleas may possibly constitute a source of danger, though no direct evidence is forthcoming suggesting that they are able to transmit the infection.

E. H.

SABELLA (P.). **Il tifo esantematico o tifo degli accampamenti.** [Exanthematic Typhus, or Camp Fever.]—*Policlinico.* Sez. prat. 1915. Aug. 29. Vol. 22. No. 35. pp. 1164–1167; and Sept. 5. No. 36. pp. 1197–1205.

In view of the possible importation of typhus into Italy, as the result of the present military operations, the author thinks it well to supply an exhaustive systematic account of the disease for the benefit of Italian practitioners. Spotted typhus is ordinarily so rare in Italy that the few sporadic cases that do occur are generally wrongly diagnosed. Due stress is laid on the importance of the louse as a carrier.

J. B. N.

LANCET. 1915. June 12. p. 1251. **The Spread of Typhus Fever by Lice.** [Annotation.]

The writer calls attention to some of the old writings on this subject and mentions the report of an eye-witness and victim of the disasters of Napoleon's Russian campaign in 1812 appearing in that vivid book "Mémoires du Sergent Bourgogne."

In its retreat from Moscow, Napoleon's army was harassed by a severe epidemic of typhus carried by vermin and the soldiers spread death and destruction by this disease wherever they passed through Germany on their way back.

Dr. KRANTZ, a Prussian army physician, published a report in 1817 in which the relation between lice and typhus is mentioned, and also notes on open air treatment of the disease. This form of treatment resulted in a mortality of only 2 or 3 per cent., while patients in ordinary hospitals died in large numbers and infected physicians and nurses who attended them.

The open-air treatment abolished the period of convalescence, for three days after the patients had been free from fever for 24 hours, they were fit for half a day's march or more.

Various methods of killing lice are briefly dealt with and some are quoted from a circular recently issued by the German Imperial Board of Health. The parasiticidal drugs recommended are sabadilla vinegar (containing veratrine) kerosene, eucalyptus oil, and balsam of Peru. WEYLAND in the Franco-Prussian war found that exposure to benzine vapour for two or three hours killed all lice.

The German State railways have an excellent plan for cleaning their carriages. The whole railway carriage is run into a large iron cylinder which is hermetically sealed; then the air is partially exhausted and the contents of the cylinder warmed up by steam pipes. The lice infecting the upholstery can survive exposure to a partial vacuum, but when the heat is turned on their body fluids are evaporated at the low pressure and they die of desiccation.

E. H.

FRAENKEL (Eugen). **Zur Fleckfieberdiagnose.** [On the Diagnosis of Typhus.]—*Munch. Med. Woch.* 1915. June 15. Vol. 62. No. 24. pp. 805–808.

A somewhat lengthy article in which the writer calls attention to his previous paper on the pathological histology of typhus [see this

Bulletin, Vol. 3, p. 564] and emphasises the importance of the diagnostic aids thus provided. The results obtained previously have been confirmed by the examination of several more cases since the outbreak of war and notes are given of the results of a pathological investigation of eight of these patients.

E. H.

DIETSCH (Carl). **Die künstliche Stauung als diagnostisches und differentialdiagnostisches Hilfsmittel beim Fleckfieber.** [Artificial Stasis as a Diagnostic and Differential Diagnostic Aid in Typhus.]. —*Munch. Med. Woch.* 1915. Sept. 7. Vol. 62. No. 36. pp. 1231–1232.

The author points out that there are three stages in the development of the typical exanthem. In the first stage there is a hyperaemia, that appears on the abdomen, chest, and extremities as scattered rose coloured spots. This hyperaemia is followed by stasis of the smaller blood vessels, finally resulting in a total block of the vessels. As a result the exanthem deepens in colour, becoming cyanotic in appearance, this constituting the second stage. In the third and last stage brownish pigment spots develop, which are often very dark and generally appear after the expiration of the fever, when the patient is beginning to improve.

By artificial stasis of the vessels, the author finds that it is much easier to recognise the exanthem in cases where it is not characteristic, or is sparingly developed. It is only necessary to put a bandage round the arm. After engorgement of the vessels any exanthem shows up more clearly and the passage from the first to the second stage in the development becomes evident, the rose-coloured spots gradually turning blue. Finally, brown pigment can be made to show up even in the second stage of the exanthem.

The manner in which this exanthem develops is sufficient to distinguish it from the eruption in the case of typhoid and the author strongly recommends this method.

E. H.

LIPSCHUETZ (B.). **Zur Kenntnis der Klinik des Flecktyphus nach Beobachtungen an der Przemysler Epidemie im Frühjahr 1915.** [The Clinical Aspects of Typhus from Notes on the Przemysl Epidemic of Spring, 1915.]—*Wien. Klin. Woch.* 1915. Aug. 12. Vol. 28. No. 32. pp. 856–860. With 1 chart.

The writer made notes on the disease during the great epidemic of typhus in Przemysl that occurred in the spring of 1915. As a result of his observations he is of the opinion that two stages of typhus may be distinguished : a pre-exanthematous stage and the exanthematous febrile stage. The former is distinguished by the presence of an irregular fever not rising to more than 38° C. and sometimes dropping to normal, and certain vague symptoms such as headache, backache, etc. This stage generally lasts about three days and is succeeded by the exanthematous febrile stage during which the characteristic

exanthem appears and also the temperature rises to 39° or 40° C., rarely if ever being as low as 38° C. The exanthem may be of various types :—

1. Generalised exanthem on the body.
   (*a*) Small macular type with eruptions of uniform size.
   (*b*) Large macular type, with various different sized eruptions.
2. Petechial exanthem.
3. Eruption especially developed on the elbow and upper arm, but similar to that on the trunk.
4. Localised on the palms of the hands and soles of the feet, with various clinical forms.
5. Very early-formed small petechiae in pre-existing growths.

The mortality during the epidemic was about 5 to 6 per cent., but the cases were often complicated by the presence of other diseases. A very large number of cases occurred amongst the soldiers of the Army Medical Corps and the hospital attendants, owing to the difficulty of protecting them against louse infection.

E. H.

MAITLAND (T. Gwynne). **Notes on the Typhus Epidemic in Serbia, 1915.**—*Brit. Med. Jl.* 1915. Aug. 21. pp. 283–285

The writer is director of the typhus colony at Skoplie (Uskub), Serbia, and from March 1st to the end of April, 1915, about 1,800 cases of typhus passed through his hands. The process of disinfection adopted by Dr. Maitland and his limited staff is described in some detail. The patients were shaved and carefully disinfected before being admitted to the wards, and his policy seems to have been successful, for the disease was kept under control.

The writer then gives an account of the symptoms and lays especial stress on the necessity of paying attention to the hygiene of the mouth, the neglect of which commonly leads to such complications as parotitis, laryngitis, and otitis media. In most cases the onset of the disease was slow, a rather unusual feature in most epidemics, and the great infrequency of pulmonary stasis, where there was often much cardiac asthenia, is very striking.

The two most fatal types of the disease are the so-called fulminating cases and the cases exhibiting circulatory stasis. Treatment was entirely symptomatic and the writer considers that the use of alcohol in any form is to be avoided. The writer's experience did not show that fresh air was such a potent factor as it is advertised to be, though naturally it is a *sine qua non* in all diseases.

E. H.

KREIBICH (C.). **Maculae coeruleae bei einem Falle von Typhus exanthematicus.** [Maculae coeruleae in a Case of Typhus.]—*Wien. Klin. Woch.* 1915. June 3. Vol. 28. No. 22. pp. 591–592.

The writer records a case of typhus on which blue spots were found in between the typical typhus exanthem. *Pediculus pubis* was found on searching the patient's body and nits of the same species were found

along the eye-lashes. The blue spots, therefore, were probably the result of the bites of these lice and it is considered probable that *Pediculus pubis* in addition to *P. vestimenti* is responsible for the transmission of typhus.

E. H.

LEVY (G. H.) & KANTNOR (J. L.). **Study of a Case of Epidemic Typhus Fever imported into Central New York.**—*Boston Med. & Surg. Jl.* 1915. Sept. 23. Vol. 173. No. 13. pp. 473–476. With 2 figs.

The record of a case of typhus in a Macedonian immigrant who was admitted to a hospital in Syracuse. The authors give a full account of their clinical observations and a chart showing temperature, pulse, respiration, and blood pressure, with another showing leucocyte counts.

E. H.

MOLLOW (W.). **Beitrag zur Therapie des Flecktyphus.** [A Note on the Treatment of Typhus.]—*Wien. Med. Woch.* 1915. June 5. Vol. 65. No. 23. pp. 886–891. With 5 figs.

The author has treated five cases of typhus by means of subcutaneous injections of sensibilised typhoid vaccine, and gives the clinical history of three of these patients in detail together with curves showing the course of the temperature. The duration of the fever saw eleven days in the first; nine days in the second; and 17 days in the third, so that the course of the disease was curtailed. The vaccine was administered in 0·4 gm. doses subcutaneously according to KORÁNYI's technique.

The author does not attempt to explain the reason why typhoid vaccine seems to affect typhus, but points out that diphtheria antitoxin is effective against erysipelas, and other analogous cases can be found.

E. H.

ROUBITSCHEK (Rudolf). **Die Behandlung des Flecktyphus mit normalem Pferdeserum.** [The Treatment of Typhus with Normal Horse Serum.]—*Wien. Klin. Woch.* 1915. July 1. Vol. 28. No. 26. pp. 706–707. With 3 curves.

The author has treated 25 cases of typhus with subcutaneous injections of normal horse serum (without phenol) and finds that the course of the disease is considerably affected thereby. At first the serum is administered in doses of 1 cc., but this is increased to 3 cc. if necessary, the injections being continued daily until the temperature is reduced to the normal. The author's results prove that this treatment has a very beneficial effect, reducing the fever and shortening the course of the disease, and it also lessened the mortality from an average of 30 per cent. to about 6 per cent.

Charts are given of the course of the temperature in two of the treated cases and one untreated case for comparison.

E. H.

WERTHEIMER (Heinrich). **Ueber das Verhalten des Flecktyphus bei direkter Sonnenbestrahlung.** [The Retarding of Typhus by the Rays of the Sun.]—*Wien. Klin. Woch.* 1915. June 24. Vol. 28. No. 25. pp. 678–679.

The writer exposed patients suffering from typhus to the rays of the sun for an hour at a time. The temperature was lowered by 1·7° C. in one case and 1·1° C. in another, but rose again after the treatment was stopped. The author suggests that the sun's rays may have an effect on the virus of the disease.

E. H.

RENAULT (Jules). **Mésures prophylactiques contre le Typhus Exanthematique et le Typhus Récurrent.**—*Paris Méd.* 1915. July 24. Vol. 5. Nos. 11–12. pp, 206–212.

After a short general account of these two diseases the author calls attention to the fact that both are transmitted solely by the agency of lice, and then proceeds to discuss various methods of prophylaxis, all based on the prevention of infection with lice. The method of treating persons infected with lice is described in detail. Each patient is made to remove all his clothes in one room and then passes into another room where he is treated personally. All these rooms are disinfected daily by washing out with 5 per cent. carbonate of soda and from time to time are fumigated with sulphur. Spraying with formalin is said to be ineffective.

The clothes of the patient, including hat and boots, are put immediately into a metallic box with a lid and sprayed over with 40 to 50 cc. of benzine which kills all lice in 15 or 20 minutes. Cotton fabrics are then boiled for 10 minutes in water containing 5 grams carbonate of soda to each litre. Woollen clothes are disinfected either by stoving or fumigation with sulphur. It is necessary for this sulphur fumigation to take place in the presence of water; otherwise it is not effective. Another method is to employ steam under pressure, or formalin, but in the latter case the stove must reach a temperature of at least 80° C. The patient himself is taken into a room where he is bathed and carefully washed with soap from head to foot. If his hair is long it is advisable to cut it all away, both from the head and body in cases of infection with *P. pubis*, before employing any further parasiticidal agent. All the hair is collected and burnt. After washing, the patients body is rubbed over with one of the following preparations, especial attention being paid to the head, beard, axillae and pubic regions :—

a. Camphorated oil (10 per cent.).
b. Oil of turpentine (15 per cent.).
c. Camphorated spirit (10 per cent.).
d. Chloroform water (5 per 1,000).
e. A mixture of equal parts of oil and petrol.
f. Vaseline and xylol: 90 drops of xylol mixed with 30 grammes of vaseline.
g. A solution of Anisol (Anisol 5 cc.; 90 per cent. alcohol 50 cc.; water 45 cc.).

h. Benzine. On the head applied under a bonnet; on the body under a cloak, the benzine being applied on both sides of the body.

i. Grey ointment. Especially used for the treatment of *P. pubis.* It is advisable to restrict its use to the pubic and axillary regions and to wash off all ointment two hours after its application.

j. Vaseline mixed with yellow precipitate in the proportion of 1 in 50, for the treatment of *P. pubis* in the eyelashes and eyebrows.

All these preparations destroy the lice but not the eggs, and it is necessary to repeat the treatment daily for six or seven days in order to destroy the parasites as they emerge from the eggs.

Finally, the author recommends certain measures to be taken in cases of recognised typhus, amongst which the most important is a careful disinfection of the person and clothes of all occupants of the house, in addition to the patient, as well as disinfecting the house itself.

E. H.

LEGENDRE (Jean). **Destruction des poux de corps par le crésyl et le brossage.**—*Bull. Soc. Path. Exot.* 1915. May. Vol. 8. No. 5. pp. 280–283.

The author finds that a 2 per cent. mixture (by volume) of cresyl with water kills body lice after 5 to 10 minutes exposure. The mixture does not seem to remain active after a delay of 24 hours. Cresyl does not alter the colours of clothes and when the latter are taken out and immediately rinsed in water they soon lose the odour of the parasiticide.

With regard to the coats and other parts of the clothes one can remove the eggs by brushing any parts liable to be infected with a stiff brush. The best method is to immerse one's underclothes in the cresyl and at the same time carefully brush the outer garments. By employing these means the writer claims that all body lice can be removed with certainty and the methods are easy of application in the field.

E. H.

SERGENT (Edm.) & FOLEY (H.). **Destruction par l'essence d'Eucalyptus des poux du corps, agents transmetteurs de la fièvre récurrente et du typhus exanthématique.**—*Bull. Soc. Path. Exot.* 1915. June. Vol. 8. No. 6. pp. 378–381.

The authors have studied the action of eucalyptus oil on *Pediculus vestimenti* and find that when it is placed on clothes infested with these vermin the latter are killed very rapidly. Experiments were performed on a dog and some men heavily infested with lice. The dog was rubbed with a few drops of the oil and 48 hours after not a single living louse could be found.

Eight men heavily infested with lice had eucalyptus sprayed over their clothes and after 24 hours no living parasites could be found in any part touched by the oil. During several days no lice could

be found if enough of the oil had been employed, but eggs are not destroyed by the treatment, and therefore it must be continued at least eight days.

When it is impossible to change one's clothes, this oil constitutes a good means of killing *in loco* all body lice, for it is both cheap and effective.

E. H.

ORTIGO J. **Prophylaxie du Typhus Exanthematique. Procédé de Destruction Rapide des Poux de Corps.**—*Paris Med.* 1915. Apr. 17. Vol. 4. No. 49-50. pp. 480-481.

After various experiments the author recommends the employment of a 10 per cent. solution of formalin as the best means of destroying body lice. The clothes are sprayed over with this solution and it is found that after a few minutes all lice and their eggs are killed. The advantage of this method is its simplicity and the fact that the clothes are not injured and can be worn again almost immediately.

E. H.

VON WASIELEWSKI. **Ueber die Vorbeugung von Fleckfieberübertragungen auf Aerzte und Pfleger.** [On the Prevention of Typhus spreading amongst Doctors and Medical Attendants.] *Munch. Med. Woch.* 1915. May 4. Vol. 62. No. 18. pp. 627-628. With 1 fig.

After some notes on the biology of *Pediculus vestimenti* the author proceeds to emphasise the importance of all patients in typhus hospitals being freed from lice as quickly as possible. Not only their personal clothes but also any bed clothes should be treated, and medical attendants in hospitals should wear high rubber boots to prevent any lice getting on their legs.

In short the author points out that the only way of avoiding infection is to avoid getting bitten by lice.

E. H.

GERWIN. **Eine Schutzvorrichtung gegen Flecktyphus.** [A Protective Preparation against Typhus.]—*Munch. Med. Woch.* 1915. June 8. Vol. 62. No. 23. p. 802.

The writer is in charge of a prisoner of war hospital at Wetzlar and finds that 5 per cent. cresol soap solution is a very efficient agent for destroying lice and thus preventing typhus. Patients were washed with this before entering hospital and not a single louse or egg ever remained alive.

In the case of a few typhus cases that were brought in, a wooden frame was put round the bed and 5 per cent. cresol soap solution run into a groove cut all round the top of the frame. In this way any stray lice from the bed could not cross this moat and in between the frame under the bed was sprayed with 5 per cent. carbol paraffin.

By adopting these methods the writer has kept his hospital entirely free from any cases of typhus breaking out there.

E. H.

EYSELL (A.). i. **Ein einfaches Vorbeugungsmittel gegen Verlausung und deren Folgen.** [A Simple Preventive against Louse Infection and its Results.]—*Arch. f. Schiffs- u. Trop. Hyg.* 1915. Mar. Vol. 19. No. 6. pp. 170–171.

ii. **Nachtrag zu "Ein einfaches Vorbeugungsmittel gegen Verlausung und ihre Folgen."** [A Further Note on "A Simple Preventive against Louse Infection and its Results."]—*Ibid.* Apr. No. 8. pp. 238–240.

i. It has been known for many years that the workers in the sulphur mines of Sicily are not subject to malaria and this is attributed to the fact that mosquitoes are repelled by the sulphur-containing secretions of these workmen.

The author has tried the effect of using sulphur praecipitatum on louse infested persons from the Eastern Provinces, and finds it most effective in destroying these parasites.

For a woollen shirt about two spoonfuls of the powder are brushed in back and front, and a small quantity brushed into the hems of the sleeves and the inner sides of the drawers. This method never fails to destroy all lice and the same agent is said to be also effective against bugs, fleas, biting flies, ticks and other parasites. Sulphur is preferable to naphthalene since the latter has an irritating action on the skin and a very pronounced smell.

ii. The author answers various queries to his previous note and emphasises that his method is prophylactic and not curative. Precipitated sulphur must be employed—flowers of sulphur is useless and colloidal sulphur (Sulphidal) is so dear that it is not likely to be used on a large scale. Sulphur soap is worthless as it does not affect the body lice, which are in the clothes and not on the body itself.

The sulphur will persist for at least two weeks and in most cases for a month. It should be brushed into any body-belts or cravats, if these are worn, as well as ordinary underclothes.

E. H.

NEUFELD (F.). **Zur Bekämpfung des Fleckfiebers.** [The Combating of Typhus]—*Med. Klin.* 1915. Mar. 28. Vol. 11. No. 13. pp. 365–367.

A general review with practical suggestions for avoiding the spread of typhus. With regard to the clothing worn by hospital attendants the writer recommends American oil-cloth, as the lice are unable to climb it. The ordinary hospital overalls are useless as the parasites are able to cling to it easily and get on to the body before the coat is removed. Certain experiments on the disinfecting power of SO_2 showed that an exposure of four hours in an atmosphere containing 7 per cent. of the gas was fatal to both lice and their eggs even though contained in a ball of linen.

With regard to personal prophylaxis, essential oils and similar substances were found to be quite useless.

E. H.

BALFOUR (Andrew). **Typhus Fever, Lice, and the War: A Suggestive Fact.** [Correspondence.]—*Lancet.* 1915. June 19. p. 1311.

The writer calls attention to the fact that in 1913 no less than 258 tons of sabadilla seed were shipped from La Guaira to Germany. This seed contains veratrine and sabadilla vinegar, is apparently being used by the German Army as a protection against lice, so that the above mentioned fact suggests that their Government was carefully preparing for this war in 1913.

E. H.

BROOKE (Gilbert E.). **Contact Insecticides.** [Correspondence.]—*Lancet.* 1915. Sept. 4. p. 571.

The author, who writes from Singapore, finds the following mixture the most effective contact insecticide:—

Stock solution.—Carbon disulphide 1, kerosene 20, mixed first by shaking; then add "Sanitas Sypol" 7 (made by the Sanitas Company) and keep in a stoppered bottle.

For use.—Make a 10 per cent. solution in water, adding the water to the stock, and not the stock to the water.

This 10 per cent. solution is a milk-white emulsion and is practically permanent when corked up, but is better prepared just before use. The solution kills bugs within a second or two and is stated to kill cattle-ticks instantaneously. In addition two applications destroyed all the lice and their eggs on a small pariah puppy.

E. H.

PEČIRKA (Jaromir). **Chinin als Präventivmittel gegen Typhus exanthematicus.** [Quinine as a Preventive Agent against Typhus.]—*Prager Med. Woch.* 1915. May 27. Vol. 40. No. 21. pp. 246–247.

The author states that the causative agent of typhus should be sought for in the salivary glands and alimentary canal of the body louse. He then proceeds to discuss the mode of infection and recommends on theoretical grounds that quinine, in doses of 0·2 gm. daily for 20 days, should be administered to any person found infested with lice, or liable to infection with typhus. As a reason for this it is advocated that a slight alteration in the blood will adversely affect the nutrition of any parasitic insect feeding on it, and quinine is the simplest substance that could be taken for this purpose.

E. H.

KLEMPFNER. **Ein Beitrag zur Prophylaxe des Flecktyphus.** [A Note on Prophylaxis against Typhus.]—*Prager Med. Woch.* 1915. Apr. 29. Vol. 40. No. 17. p. 193.

The author calls attention to PEČIRKA's advocacy of quinine as a prophylactic agent against typhus and brings forward facts in support of it.

Fifty Russians were brought into an isolated camp and four days after their arrival a case of typhus occurred amongst them and during the next four days one on each. On the last day treatment with quinine was begun (0·2 gm. doses administered daily) and only one more case occurred amongst these prisoners. The treatment lasted for 21 days and no further cases occurred after it was discontinued.

The author mentions a case recorded by MARIKOVSKY of a battalion at Honvéd in which 160 cases occurred in 700 men. On March 14th there were still 64 cases and then treatment with quinine was begun and continued for 21 days. No further cases of the disease occurred amongst these men.

[These results suggest that quinine may be of great use as a prophylactic against typhus, but further experiments are desirable.]

E. H.

LEPROSY.

McCoy (George W.). **The Present Status of our Knowledge of Leprosy.** *Amer. Jl. Trop. Dis. & Prevent. Med.* 1915. Aug. Vol. 3. No. 2. pp. 83–91.

In this paper, the author gives a lengthy resumé of the subject up to date. He regrets that no conspicuous advance can be recorded in reference to the cure, or the problem of the transmission of leprosy.

Reference is made to the results of Bayon and Reenstierna, who believe that they have confirmed Kedrowsky's work, and to Clegg's, Duval's, and his own cultivations of acid-fast bacilli from leprous tissues, but he does not refer to the observations of Fraser and Fletcher and of some others.

As regards human and animal inoculations he observes that "in a general way it is perhaps not too much to say that we have no evidence that leprosy has ever been produced in man or in the lower animals by artificial means."

Although reciprocal serological reactions have been reported between rat and human leprosy "the cultures are however different" and he does not believe that either disease is dependent on the other. He calls attention to the facts that in rat leprosy the organisms are largely confined to the lymph glands and that nephritis is found in about half of the diseased rats.

The serum of most lepers reacts with extract of leproma and Clegg has prepared an active antigen by boiling acid-fasts with weak caustics. The reaction to tuberculin is referred to, and in this connection it is remarked that glandular tuberculosis is very prevalent among Hawaiian lepers.

From 40 per cent. to 90 per cent. according to different workers give the Wassermann reaction. Noguchi's luetin is always negative.

Sticker's theory of primary infection in the nose "remains unproven." "Healthy nasal 'carriers' have been observed."

At Molokai "even under circumstances of most intimate contact, only about 5 per cent. of the adult natives contract the disease."

As regards diagnosis, the author sounds a note of caution in depending alone on nasal microscopic findings.

Hopes of vaccine treatment have not been realised. Heiser's chaulmoogra injections seem to improve many cases. The author believes in segregation in endemic foci, or in localities where the disease is likely to spread.

P. S. Abraham.

Currie (Donald H.). **Discussion of Paper of Surgeon George W. McCoy entitled Present Status of our Knowledge of Leprosy.**—*Amer. Jl. Trop. Dis. & Prevent. Med.* 1915. Aug. Vol. 3. No. 2. pp. 91–97.

The author maintained that "the micro-organism cultivated by Clegg and later by Brinkerhoff, Duval and the speaker, is the acid-fast bacillus found microscopically in all leper nodules" and that it is the specific cause of the disease.

To explain the failure hitherto to transfer the disease artificially in men and animals he suggested that possibly a smaller dose—not subcutaneous—"incapable of exciting local leucocytosis, such as might occur under natural conditions, might be the point upon which successful inoculation hinges." In his experience in Hawaii at least "90 per cent. of the cases had been in prolonged and intimate contact with a leper some years preceding the outbreak of the disease."

He strongly believes in segregation, which he considered had not been given a fair trial in Hawaii—the native members of the government not being in sympathy with the work.

He remarked that the descendants of the French settlers who suffered from leprosy in Louisiana were also affected in the Northern States, and that it was "the people and the way in which they live and not the locality" which influenced the spread of the disease; important factors were squalor and unhygienic conditions. Like Dr. McCoy, he could not explain why male lepers to female were as 2 to 1.

He believes that two and a half per cent. of the Hawaiians have leprosy. After some observations on diagnosis and treatment he concluded by advocating the isolation of lepers, but the isolation should be as in Norway "of such a character that the patient and his relatives will not object to it."

P. S. A.

Katsains (George M.). **The Relation of Leprosy to the Community.**—*Boston Med. & Surg. Jl.* 1915. July 8. Vol. 173. No. 2. pp. 53-57.

This paper gives a considerable amount of information relating to leprosy in Greece, where it seems to have been long endemic. It notably increased, especially in Peloponnesus, some time after the War of Independence in 1821. Most of the cities and villages were affected and the lepers were forcibly isolated and often compelled to live in caves and as outcasts. The spread was, in the author's belief, mainly due to the invasion of the Egyptian Army in 1825.

At the present time the disease is not often met with in Continental Greece but in the islands the number of lepers has been estimated at more than 1,000. At the leper asylum in Crete there are 230 patients, and in the asylum at Cyprus 250.

Large numbers are to be seen in Athens, where "driven out from every village or city in Greece, abandoned by friends and relatives and excluded by all communities" they come seeking cure and means of existence. Here they are unmolested, mix freely with the people and may engage in any or every occupation. On the other hand, in other parts of Greece the lepers are treated most inhumanely and banished from their villages and homes. The educated Athenians, in fact, following the teaching of Zambaco Pasha, believe that leprosy is inherited and not contagious. The author is also of this opinion, but admits that its transmission by contagion may occasionally take place under conditions of protracted intercourse, special predisposition, country, etc. He gives a number of interesting instances known to him which point to heredity and negative contagion.

He refers to the observations of Dr. PHOTEINOS of Athens, who has come to the following conclusion: In cases of tubercular leprosy the Wassermann reaction is positive in 76 per cent.; in nerve leprosy in 38 per cent.; and in mixed cases 75 per cent.; it seldom changes from positive to negative and then only after eight or more injections of salvarsan; the curative effects of salvarsan are not encouraging, although nodules may fade away after 10 or 15 full injections. The author records one good result from salvarsan. In Athens no case of contagion has been reported and no leper born.

P. S. A.

HONEIJ (J. A.). **Leprosy and its Relation to Massachusetts.**—*Boston Med. & Surg. Jl.* 1915. July 8. Vol. 173. No. 2. pp. 48–53.

The author considers that the leprosy problem in Massachusetts needs consideration and action and refers to a case with marked symptoms not diagnosed for three years. The establishment of new endemic centres in South America, South Africa, Nigeria and New Caledonia leads him to fear their establishment elsewhere, and he is of opinion that even early cases are a source of danger to the public. He refers to the statistics of leprosy in the United States and especially to Massachusetts where there have been about 50 cases, two or three fresh ones coming every year. The great majority were foreigners—chiefly Chinese, Portuguese and Russian and three Americans. Since 1905 the lepers have been segregated at Penikese Island, 30 having been received, and 14 are now there.

The Resolutions of the last International Conference on Leprosy are quoted. The author maintains that the segregation of lepers in Massachusetts is particularly justified on account of its increasing trade with leper countries. He urges a more tolerant and sensible attitude towards lepers, the need of a modern hospital for their proper care, federal control of immigration and the establishment of national leprosaria. [As far as can be gathered from this and from some other papers recently reviewed on Leprosy in America, it would appear that with very few exceptions the truly American cases have all acquired their disease in leprosy districts and that leprosy is not "spreading" among Americans who have not sojourned in such places.]

P. S. A.

MONTGOMERY (Douglass W.). **Illustrations of the History of Leprosy.**—*Jl. Amer. Med. Assoc.* 1915. Sept. 11. Vol. 65. No. 11. pp. 927–931. With 3 figs.

In this interesting and suggestive essay the author attempts to clear up several misconceptions in connection with leprosy and discusses the origin of the terms "Elephantiasis" as used by the Arabs and the Greeks, and "Zaarath" of the Hebrews. He adopts the suggestion that the Greeks called the disease "Elephantiasis" because of the stump foot and dragging gait that were so frequently present, and accepts McEWEN's interpretation of "Zaarath" as "taboo," and that, as UNNA pointed out, "Zaarath" had a theological and not a medical meaning. In the Septuagint "Zaarath" was translated into the Greek word "lepra," and later, Constantin also translated

into Latin the Arabic word "djudsam," which signified the disease we now call leprosy, as "lepra." "Because of the mistake in the translation of a word in the Bible and a further mistake in applying Biblical precepts to this chronic infectious disease, leprosy came to be regarded as a highly infectious malady. The author further observes :—

"As a matter of fact, leprosy is very reluctantly contagious, and must require very special favouring circumstances in order for it 'to take.' A very modest degree of cleanliness hinders its transmission. As soon as a country becomes well to do and adopts the daily tidiness incident to modern civilized life, leprosy dies out. Although, therefore, the Biblical view of the highly contagious nature of leprosy undoubtedly aided in stamping out the epidemic of the middle ages, in modern life it works an unnecessary hardship on the afflicted, and should give place to a more reasonable attitude, agreeing with the real facts of the case."

[The reviewer can to a great extent endorse these views.]

P. S. A.

MORROW (Howard) & LEE (A. W.). **Symptoms and Diagnosis of Leprosy. With Report of Cases.**—*Jl. Amer. Med. Assoc.* 1915. Sept. 11. Vol. 65. No. 11. pp. 931–934.

The authors give a good account of leprosy in its various stages and manifestations as observed in San Francisco, especially at the Isolation Hospital. This contains at present 13 chronic cases, the notes of which are appended.

In reference to its differential diagnosis, they observe that the Wassermann reaction is frequently positive in nodular and "mixed" cases, and generally negative in anaesthetic cases. In almost all nodular cases, it is positive with leprous antigen. In all types, the luetin reaction is negative, unless the disease is complicated by syphilis.

P. S. A.

CHIPMAN (Ernest Dwight). **The Etiology and Treatment of Leprosy.** —*Jl. Amer. Med. Assoc.* 1915. Sept. 11. Vol. 65. No. 11. pp. 934-937.

In discussing the etiology of this disease the author thinks it improbable that it spreads by direct inoculation on account of "the uniformly negative results in numerous human and animal experiments." He considers that, although the role of insects as intermediaries is as yet unproved, certain of them must be regarded with suspicion, especially flies, the bed bug and the acarus of scabies, and with regard to the latter he refers to HEISER'S cases, 55 per cent. of which had been previously infected with scabies. In any scheme of national control, he suggests that segregation should be more or less complete according to the type and duration of the disease. Many cases of nerve leprosy, where no bacilli can be demonstrated in the nasal or other secretions, are not comparable with active nodular cases in infectivity.

As regards treatment, the various methods of which he shortly reviews, he favours HEISER'S subcutaneous injections of chaulmoogra oil 60 cc, camphorated oil 60 cc. and resorcin 4 gm., as well as local cauterisations and surgical measures and hot baths.

P. S. A.

A noteworthy discussion on the above three papers* and on the subject in general took place. Some points brought out may here be referred to. Dr. O'Neill [in charge of the San Francisco Isolation Hospital] stated that when in 1878 the lepers in California were segregated, they were 82 in number; they have been gradually diminishing and now there are only 15. The cases were all imported; he had never seen one which had its origin in California. He considered that there was little or no danger of contagion from the ordinary nerve type and that when there were no open lesions, discharges from the nose or organisms found, the leper might be allowed to go free.

Dr. McCoy [Honolulu] considered that the question of segregation may be largely a matter of geography; in certain communities leprosy does not spread. In New York, where there may be always from 40 to 50 cases, there has been no case of local origin; measures different from those needed in Hawaii might therefore suffice. In Hawaii nodular and ulcerating nerve cases are segregated, and others put under parole. Although the bacilli are not usually found in the nasal cavities in early cases they may occasionally only be found there even in pure nerve leprosy. He emphasized the help given by surgery, and referred to the work of Dr. Hollmann in Honolulu. He had recently seen a child with leprosy, aged 19 months—the earliest case he knew—with a nodule on the arm. This was excised although he did not believe that there is a recognisable "initial lesion" of leprosy.

Dr. Ravogli [Cincinnati] thought that "leprosy is very slightly contagious, yet is growingly contagious." It frequently begins with an ulcerated wound on the foot.

Dr. Sutton [Kansas City asked whether the different types of the disease might not be due to different strains of the bacillus?

Dr. Schmidt observed that the serological diagnosis of leprosy was not of great value. Serologically and bacteriologically human and rat leprosy were the same.

Dr. Lain [Oklahama] remarked that leprosy had not reached the American Indians, many thousands of whom he had examined. Dr. Howard Fox [New York] agreed that there is no reference in the Old Testament to any disease which can be positively recognised as the leprosy of the present day. In the legal control of lepers he thought that harmless anaesthetic cases should be distinguished from nodular cases in the ulcerating stage.

Dr. Montgomery [in reply] considered that an erythematous leproid was often the initial lesion. He advocated a national leprosarium, which should not be in an endemic area where the disease might thrive.

Drs. Morrow, Lee, O'Neill and Chipman also replied.

P. S. A.

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* Read before the Section of Dermatology at the Sixty-sixth Annual Session of the American Medical Association, San Francisco, June, 1915.

BLASCHKO (A.). **Kann uns die Lepra in den russischen Ostseeprovinzen gefährlich werden?**—*Deut. Med. Woch.* 1915. June 3. Vol. 41. No. 23. pp. 676–677.

The author considers that the penetration of the German army into the Baltic Provinces of Russia raises a new danger. In 1896 he pointed out that in Germany Memel alone was a leprous district, and that the few cases that then existed had probably arisen from intercourse with the neighbouring Russian provinces where at least 1,000 cases were known and where leper hospitals had long been established. Although, in his opinion, leprosy can be transmitted, instances of this are so rare that some other special conditions must be associated. He suspects that the disease is spread by blood-sucking insects and that the immunity of certain individuals may be due to the fact that fleas, for example, are not attracted to everyone. The following suggestions are recommended :—(1) When troops move to fresh quarters the Head of the District should state whether there are lepers or leper hospitals in the neighbourhood ; the German army doctors should communicate with the local doctors on the subject. (2) No German soldiers should be quartered in houses where lepers have lived. (3) The troops should be protected from parasites by naphthaline, cresol powder, etc. (4) The books of leper hospitals should be examined and the names and addresses of discharged lepers noted.

P. S. A.

DELÉPINE (Sheridan). **Case of Suspected Leprosy at the Prisoners of War Camp, Handforth.**—*Jl. R. Army Med. Corps.* 1915. June. Vol. 24. No. 6. pp. 576–579. With 2 figs.

Professor Delépine reports a typical case of nodular leprosy in a German aged 53 interned in the war camp at Handforth. Since leaving Germany at the age of 21 he had been a ship's fireman, and had been in India, China, Mediterranean and Black Seas and America, but seldom remaining long on shore. About a year ago he burnt his foot, which swelled and was long in healing, being six weeks in hospital in Constantinople and later in a Black Sea hospital. After returning to his home in Sunderland, his face became affected ; about two months ago he had been losing his voice and he had felt easily tired and heavy in the legs.

On examination (July 21st 1915) the face had a typical leonine appearance with thickening of the superciliary regions, nose, chin and ears, and loss of hair and eyebrows. The mucous membrane of the palate and pharynx was irregularly thickened, but no obvious change was observed in the anterior fourth of the nasal septum. The voice was reduced and roughened. Nodules and indurations were found on the arms and hands, and patches of discolourations, and reduced sensitiveness. The lower parts of the legs and the feet were more severely affected, and with a general purplish, coppery colour.

Microscopical examination of a number of the lesions revealed the presence of numerous lepra bacilli. Dr. Delépine considers that "the case should undoubtedly be isolated, more especially in consideration of the feelings of the other persons interned in the camp."

P. S. A.

O'Brien (C. M.). **An Address on Leprosy, with an Account of a Case, delivered before the Section of Medicine in the Royal Academy of Medicine in Ireland on May 21st, 1915.**—*Lancet.* 1915. Sept. 4. pp. 529–533. With 1 fig.

The author describes a typical case of early nodular leprosy in a man aged 38 born in Belfast, who had served 10 years in the army abroad, in Malta, Bermuda, Halifax, Jamaica and South Africa (5 years); since 1906 he had worked as a farm labourer in Ireland. In the autumn of 1913 a crop of boils appeared on the back of the neck and his eyes became red and swollen. In August 1914 he tried to rejoin the army, but was rejected because of a "skin rash." In March 1915 he came under Dr. O'Brien's care and was found to be suffering from leprosy. He complained of weakness on slight exertion, occasional shooting pains in the back and shoulders and at times sensations of "hot and cold" all over the body. He felt the skin of the face, especially the forehead, tight as if going to crack; it was thickened and furrowed, dark brown and glistening, the eyebrows prominent and tuberculated and with scanty hairs, nose thick, broad and flattened, chin broad and prominent, and the lips thick. There were infiltrations and tubercles on the neck, shoulders and nares and on the extremities. The hands were swollen and cushion-like on the back, ash-grey in colour, the thenar and hypothenar muscles flat and flabby. The reflexes were normal. No anaesthesia and the mucous membranes free. The patient showed no reaction with tuberculin. The Wassermann reaction was markedly positive although there was no evidence or history of syphilis. The bacilli of leprosy were demonstrated. In his preliminary remarks the author alludes to the early literature of leprosy, discusses the theory of contagion and among other points especially refers to Bayon's recent observations. A photograph of the case is given.

P. S. A.

Hassin (G. B.), Burke (Gordon) & Nuzum (John). **Leprosy or Syringomyelia?**—*Jl. Amer. Med. Assoc.* 1915. July 17. Vol. 65. No. 3. pp. 235–238. With 5 figs.

The authors remark upon the well-known difficulty of diagnosis of so-called nervous or anaesthetic leprosy from syringomyelia, and describe a case in point. A lady aged 62, born in Norway, presented herself with deformities of all four limbs. The forearms were covered with scars from burns and the fingers were gone. On the lower limbs the feet were absent and the stumps the site of large ulcers. Complete anaesthesia was exhibited on the forearms. hands and legs and patches of anaesthesia on the chest, face, eyelids and cornea together with a cataract, ectropion and conjunctivitis of one eye. The median, ulnar, musculo-spiral and peroneal nerves showed tenderness but no thickening and nodosities either upon them or on the "auricular magnus." Response to electrical stimulation in the muscles and nerves was normal and no discoloured spots were to be seen anywhere upon the skin. The tendon, skin and mucous reflexes were everywhere absent.

The affection started when 8 years old, with pain and weakness in the right foot, followed 4 years later by a perforating ulcer and subsequently by painful abscesses on the other extremities with ulceration and loss of bone. From time to time amputations were performed, the last 9 years ago, i.e., 43 years after the onset of the disease. Menstruation began at the age of 19, the menopause at 40. Two distant relatives had suffered from leprosy. Microscopically a number of sections of tissues from the legs were examined and in only two a limited number of bacilli resembling those of tubercle were found, but no so-called "lepra cells."

The authors regard it as a case of leprosy and not syringomyelia for several reasons :—Both upper and lower limbs were involved in the trophic changes and anaesthesia ; the latter did not end abruptly and it was also present in patches on the face and chest ; the tendon and mucous reflexes were absent ; there was paresis of the upper branches of the facial nerve, with ectropion and anaesthesia of the lids and cornea ; the absence of scoliosis, of muscular twitchings, of atrophy of the small muscles of the hands, and of electrical changes were also against the diagnosis of syringomyelia. The atrophy and absorption of the bones of the fingers as revealed by X rays and the absence of scars were moreover particularly characteristic of leprosy. The difficulty of finding typical bacilli and the absence of nerve thickenings were, in the authors' opinion, due to the old-standing chronic nature of the case.

P. S. A.

Candido (João). **Lepra de fórma syringomyelica.** [Leprosy simulating Syringomyelia.]—*Brazil Med.* 1915. Sept. 15. Vol. 29. No. 35. pp. 273–276.

Notes of a case of leprosy in a girl in which the tracts of anaesthesia in the limbs simulated to a certain extent the kindred anaesthetic features in syringomyelia. As the patient had lost several toes, and in addition gave a strong family history of leprosy, the diagnosis does not seem to have been very difficult to make, although leprosy bacilli could not be detected in pieces of skin excised from the anaesthetic areas.

J. B. Nias.

Lara N. (A.). **Lepra blanca en Yucatan.** [Anaesthetic Leprosy in Yucatan.]—*Rev. Med. de Yucatan.* 1915. Feb.-Mar. Vol. 10. No. 4–5. pp. 75–78.

A few remarks on the liability of confounding the anaesthetic forms of leprosy with vitiligo, and other dyschromatic lesions of the skin. The nasal mucus should always be examined in such cases for bacilli, iodide of potassium being given for two days previously in order to produce a catarrh. In this way the writer was able to confirm a diagnosis of leprosy in 8 out of 11 suspected cases of skin affection. One case is narrated at length.

J. B. N.

HONEIJ (James A.). **Leprosy—The Presence of Acid-Fast Bacilli in the Circulating Blood and Excretions.**—*Jl. Infect. Dis.* 1915. Sept. Vol. 17. No. 2. pp. 376–387.

Examinations were made at the Penikese Leper Colony as to the presence of bacilli in the blood, urine, faeces, sputum, nasal mucus and other secretions and discharges of lepers. The author refers to the observations of other workers, and describes his own careful methods and their results.

Blood. Of 28 examinations among 16 patients, 9 were positive, 3 doubtful and 16 negative.

Urine. Of 41 examinations in 16 patients, 6 were positive in 9 of them.

Faeces. Of 27 examinations in 16 patients, 10 were positive in 6 patients.

Sputum. In 41 examinations of 16 patients, 32 were positive and 9 negative; 14 patients giving positive and 2 negative results.

Nasal mucus. Sixteen patients in 41 examinations gave 34 positive, 6 negative and 1 doubtful result, 14 of the 16 having the bacilli.

Ulcerations. In 15 patients with bullae, ulcers and pustules the bullae were positive in 5, negative in 10; ulcers 13 positive and 2 negative; pustules, 7 positive and 8 negative.

Tears. Negative in 26 examinations with 13 patients.

Care was taken to obtain, prepare and stain the specimens uniformly, and to eliminate contamination. In the case of blood, urine and faeces local lesions were avoided. Inoculation of guinea-pigs and failure of cultivations proved that the bacilli were not of tubercle. The author concludes that the acid-fast bacilli were found frequently enough in the circulating blood and the secretions, etc., to indicate that these may play a part in the spread of the disease and that insect transmission may be a possibility.

A copious bibliography is appended. P. S. A.

FRASER (Henry) & FLETCHER (W.). **The Cultivation of the Leprosy Bacillus.**—*Ann. Trop. Med. & Parasit.* 1915. July 31. Vol. 9. No. 3. pp. 381–382.

In their article "The Bacillus Leprae: Has it been cultivated?" in the *Lancet*, 1913 [see this *Bulletin*, Vol. 2, p. 502] the authors stated that "in common with other workers we have isolated diphtheroid organisms, but these are ubiquitous and demand no special consideration." They then considered that "the diphtheroids were contaminators, and had no relation with the leprosy bacillus; further investigations carried out during the past two years have confirmed that opinion." In the former experiments, cultures of a diphtheroid were only occasionally obtained in one or two tubes, but since improving the technique and excising nodules free from contamination, no cultures have been obtained. Material from 52 non-ulcerating nodular cases, and the media of every claimant to success have been employed without result.

The conclusion still is that the leprosy bacillus has not been cultivated, that the diphtheroids and other organisms are merely contaminators, and that there is no evidence that the acid-fast bacillus of Kedrowsky is the leprosy bacillus. P. S. A.

NAKAJO (S.) & ASAKURA (T.). i. **The Serologic Diagnosis of Leprosy.** —*Jl. Infect. Dis.* 1915. Sept. Vol. 17. No. 2. pp. 388–399.

ii. **Further Observations on the Serologic Diagnosis of Leprosy.**—*Ibid.* pp. 400–402,

These papers describe an elaborate series of serological experiments, employing as antigens Koch's "old tuberculin," Wassermann's syphilitic antigen, leprous nodule, leprous clots, etc.

In 39 out of 42 leprous sera, distinct reactions, positive or negative, were obtained with old tuberculin, 21 positive in 24 tubercular and 6 in 15 anaesthetic cases. The reaction was in regular proportion to the severity of the disease, especially in the tubercular cases.

In a second series of observations with old tuberculin in 10 cases, 7 gave positive results.

Thirty-three cases examined by the Wassermann test gave 26 positive results.

The main conclusion arrived at is that, if the serum of a doubtful case produces positive results both with old tuberculin and the Wassermann antigen, the probabilities are that the patient is a leper.

P. S. A.

FLETCHER (William). **The Wassermann and Luetin Reactions in Leprosy.**—*Jl. of Hygiene.* 1915. July. Vol. 15. No. 1. pp. 102–126.

Dr. Fletcher examined 100 cases at the Kuala Lumpur Leper Asylum for the Wassermann reaction by the Browning, Cruickshank and McKenzie method, with positive results in 22, 12 being among 44 nodular, and 10 among 56 anaesthetic cases. In only one was there visible evidence of former venereal disease, but 33 admitted a history of syphilis, and of these 13 reacted positively. In a control group of 110 non-leprous persons there were 11 positive reactions, 8 being among 21 who admitted former syphilis. It did not appear that either the duration of the disease or its activity had much influence on the Wassermann reaction. Although seventeen of the 22 positive reactions were in advanced cases many old and progressing cases were negative. In some cases the reaction was exceptionally powerful—the deviation of complement amounting to as much as 50 or 30 doses.

Luetin tests in 21 lepers, 13 of whom gave positive Wa sermann results, were negative, and lesions of 10 cases with positive Wassermann reactions showed no *Treponema pallidum.* These facts are in favour of the view that the positive Wassermann reactions were due to some other cause than syphilis and that leprosy itself may cause a positive deviation of complement by the Browning, Cruickshank and McKenzie method.

The observations are carefully tabulated and numerous references to the work of others are appended. The paper is an important contribution to the subject.

P. S. A.

BARBER (Marshall A.). **I. Experiments on the Immunization of Guinea Pigs by the Inoculation of Avirulent Tubercle Bacilli in Agar. II. Observations on Animals inoculated with Tuberculosis from Lepers.**—*Philippine Jl. Sci.* Sect. B. Trop. Med. 1915. Mar. Vol. 10. No. 2. pp. 145–161.

A monkey, inoculated subcutaneously with spleen pulp containing leprosy bacilli taken post-mortem from a leper, died in two months with lesions of tuberculosis. Spleen pulp from this monkey was inoculated into another monkey which died of tuberculosis in 29 days. A pure culture was made from the inguinal glands of the latter and inoculated into 20 guinea-pigs. Seventeen of them died of tuberculosis in an average of 120·6 days—with unusual enlargement of the spleen—nearly double the average ratios of a series dying of tuberculosis of human sputum origin. In three other series of inoculations with different leper spleens, part of the guinea-pigs developed tuberculosis, in one series only one in five.

P. S. A.

PLAGUE.

JOHNSTONE (R. W.). **Report to the Local Government Board on the Progress and Diffusion of i. Plague, ii. Cholera, iii. Yellow Fever throughout the World during the Year 1913.**—*Rep. to Local Govt. Brd. on Public Health & Med. Subjects.* vi + 110 pp. 1915. London: Printed under Authority of H.M. Stationery Office.

The first 64 pages of Dr. Johnstone's Report deal with the progress and diffusion of plague throughout the world during the year 1913. It is in itself a summary of the various reports dealing with the question, published in the different countries affected.

In most of the countries under observation there was no very marked change in the prevalence of plague during 1913 as contrasted with the preceding twelve months—India is a notable exception to this rule, as during 1913 a marked falling off in the reported mortality occurred. The provisional figures officially published for the areas under registration in British India show that 217,145 persons died of plague in 1913 as compared with 306,448 in 1912 and 846,873 in 1911. A consideration of these figures, however, affords no ground for assuming that plague prevalence has yet exhausted its virulence in India. During the first nine months of 1914, 227,149 persons died of plague in India—some 10,000 more than the plague deaths recorded for the whole of 1913. It is, however, satisfactory to learn that the present low standard of sanitation in India is undergoing progressive improvement and that most Indian municipalities are being equipped with a staff of trained sanitary officers whose efforts may, before long, be expected to secure reduction of the incidence of plague as well as of other preventable diseases.

Details are given of the various outbreaks of plague reported throughout the world during the year. In most cases the incidence of plague year by year, from the first introduction of the disease during the present pandemic, is given, and thus the course of the infection in a given locality is made readily apparent.

R. St. J. Brooks.

ELKINGTON (J. S. C.). **A Review of Recent Literature and Work on the Epidemiology of Plague.**—*Commonwealth of Australia. Quarantine Service. Publication* No. 5. 32 pp. With 1 map. 1915. Melbourne: Albert J. Mullett, Govt. Printer.

This Review is primarily intended for quarantine officers, and contains much useful information in a succinct form on the etiology and spread of plague, the diagnosis of the disease in man and rodents, the habits of rats and the measures of organised activity against the admission and spread of plague. In the latter connection attention is directed to the peculiarly dangerous geographical position of Australia. Numerous epidemic centres are distant but a few days travel from that country—to the northward Java, Hong Kong, Canton, Formosa; to the north-eastward, New Caledonia; to the north-westward Colombo. These facts afford ample reason for the constant watchful activity on the part of the Commonwealth Quarantine Service and the State Health Departments.

R. St. J. B.

Brooks (Ralph St. John). **The Incidence of Plague in Europe.** [Correspondence.]—*Lancet.* 1914. Dec. 19. pp. 1437–1438.

Strickland (C.). *Ibid.* 1915. June 19. pp. 1311–1312.

In this *Bulletin* [Vol. 5, p. 23], a paper by Strickland was summarised and a note appended in which some criticisms were made on certain of the conclusions arrived at. These criticisms were more fully stated in a letter by Brooks published in the *Lancet,* and to this letter Strickland replies, maintaining his former views. From the facts that in East Anglia a flea-rate of 2·7 [this figure Strickland concedes as the correct one, not that which he previously gave] was associated with a plague epizootic of 11 per cent. in the winter of 1910, and in the following summer–autumn a flea-rate of 4·5 was associated with an infection-rate of only 0·2 per cent., Strickland argued that the flea-rate could not be the main factor in determining the intensity of the epizootic. Brooks pointed out that the first figure represents the incidence in areas selected because they were probably infected, and that the latter figure does not represent any incidence at all, because as soon as an infected rat was got from a district, the supply of rats from that district was stopped. Strickland's reply is that the selection-method does not matter: 15,000 rats had been found with a plague incidence of 0·2 per cent. He contends that "if a flea-rate of 2·7 causes an epizootic of 11 per cent. among 123 rats in a town, village or hamlet, then a flea-rate of 4·5 should cause a much greater epizootic than 0·2 per cent. among any 15,000 rats one likes to examine," i.e., if the incidence depends significantly on the flea-rate. [This seems quite unjustified. It is of course only for infected populations that the relation between flea-rate and incidence is held to exist. The only incidence figure which can be obtained from the later investigation is that of 200 parishes 19 were infected, i.e. 9·5 per cent. The incidence in the infected parishes is unknown for the later investigation, and no comparison with them is possible. Implicit in Strickland's argument is the idea that because their flea-rate is high, the other parishes should have been infected, but this is a different question.]

J. Henderson Smith.

Swellengrebel (N. H.). **Ueber die Zahl der Flöhe der Ratten Ost-Javas und die Bedeutung des Parallelismus von Flöhe- und Pestkurven.** [The Flea Infestation of East Java Rats and the Significance of the Parallelism of Flea and Plague Curves.]—*Zeitschr. f. Hyg. u. Infektionskr.* 1915. Mar. 1. Vol. 79. No. 3. pp. 492–510. With 7 figs.

With reference to the conclusions of the Indian Plague Commission that the yearly reappearance of epizootic plague in India is conditioned by the periodic increase in the number of fleas, the author observes that, while his experience in Java has been somewhat at variance with these opinions, it is very dangerous to criticise conclusions which are arrived at on epidemiological grounds in a determined district, in the light of other investigations conducted in another part of the world where, very likely, quite different conditions obtain.

In conformity with Indian experience, a correlation between the average number of fleas per rat and the number of plague deaths is often observed in Java, but there are important exceptions to this rule. The seasonal variation in the number of fleas per rat has been investigated in six districts in East Java, five of these being plague infected and the remaining district—Ngantang in the province of Malang—being free from infection. The flea counts, throughout the year, showed the least variation in Ngantang and in Surabaya, where very few cases of human plague occurred. In Ngantang the number of *X. cheopis* per rat varied from 0·4 in January 1912 to 1·0 in May 1913 and in Surabaya from 0·8 in May 1912 to 2·6 in July 1912 for *Mus norvegicus* and from 0·9 to 1·7 for *Mus rattus*. On the other hand very significant variations were observed in the districts of Kediri, Modjoroto and Sengguruh where epidemic plague flourished with great intensity. In Kediri the parallelism between the flea and plague curves was well marked; at the commencement of the year 1912, when the plague incidence was slight, the flea count reached a maximum of 2·6 while in the second half of the year, when the epidemic reached its maximum, the numbers of fleas per rat rose to 4·4. During the height of the epidemic of 1913 the flea count reached the figures 6·2 per rat. This correlation between the flea and the plague curve was no , however, always found to obtain, as is shown by the figures obtained for the district of Malang, where an actual antagonism existed between the curves. From June to October 1912 the flea count per rat fell from 1·8 to 0·9, whilst the number of plague cases increased from 12 to 29 per month.

The author is of opinion that, so far as Java is concerned, the increase in the number of fleas per rat during periods of epizootic plague, when it occurs, is conditioned by a "secondary concentration" of the flea population on the diminishing number of the rodent hosts available. The normal flea count is not the only factor by which the greater or lesser intensity of plague is brought about, although doubtless a certain amount of significance must be attached to it.

R. St. J. B.

Swellengrebel (N. H.) & Hoesen (H. W.) **Ueber das Vorkommen von Rattenpest ohne Menschenpest in "klandestinen Herden."** [The Occurrence of Rat Plague without Human Plague in Hidden Foci.]—*Zeitschr. f. Hyg. u. Infektionskr.* 1915. Vol. 79. No. 3. pp. 436–451. With 3 figs.

It has been observed that in certain districts of Java, cases of rat plague may occur, and may continue to occur, which are not associated with human plague. Several examples of this state of affairs are here given in villages in the Javanese provinces of Surabaya and Kediri; such villages often being connecting links between places in which human and rat plague flourish side by side. These hidden foci are peculiarly dangerous, as they are apt to be overlooked by the sanitary authorities and become the means of spreading infection in the surrounding districts.

The circumstances that determine the transference of infection from rat to man are conditioned by the number of infected fleas available at a given moment of time and the number of living rats

that are available for the flea population at the same time. When the first number is great and the second small, the circumstances are favourable for an outbreak of human plague. The absence of human plague in European ports affected with rat plague may be explained through the prevalence of *Mus norvegicus* and the relative scarcity of rats in human habitations.

R. St. J. B.

FERNANDEZ de YBARRA (A. M.). **The Recent Outbreak of Bubonic Plague in Cuba.** [Correspondence].—*Lancet.* 1915. Aug. 7. pp. 307–308.

The opinion is here expressed that the present reappearance of plague in Havana is a recrudescence of the outbreak of 1912, which appeared to be extinguished by June 20th, 1914. During 1915 three human plague cases occurred in February, one in March, eight in April and four in May, up to the 7th of that month. In one instance three cases occurred in the same building—a charcoal store and depository for empty sacks in the residential part of the city. No rats were caught in the subsequent trapping and fumigation carried out on the premises. It is suggested that these facts show evidence of the transmission of plague by fleas harboured in empty bags, a possibility, however, limited to the city and not regarded as extending to transportation to a distance or to foreign commerce.

R. St. J. B.

NICOLAS (Ch.). **A propos de la peste en Nouvelle-Calédonie.**—*Bull. Soc. Path. Exot.* 1915. July. Vol. 8. No. 7. pp. 422–425.

Nicolas has observed three small outbreaks of plague in New Caledonia, the first in October 1913 in the village of Azareu, the second in November 1914 in the village of Nérin and the third in May 1915 in the villages of Azareu and M'Baraoua. The epidemics were strictly limited and, as in the case of the previous observations by the author in Bondé, New Caledonia, no excessive mortality among the rat population was noticed, nor did the malady show any correlation with a diminution or increase in the numbers of these animals. Nicolas concludes that in addition to the rat-flea mode of transmission there must be another mode of conservation and propagation of the plague bacillus.

[It is not stated whether the cases in these epidemics were bubonic, septicaemic or pneumonic; the observations are, in consequence, robbed of a great deal of their interest.]

R. St. J. B.

LAFONT (A.), LECOMTE (A.) & HECKENROTH (F.). **Une observation de méningite cérébro-spinale à Dakar, causée par le bacille de Yersin.**—*Bull. Soc. Path. Exot.* 1915. Mar. Vol. 8. No. 3. pp. 92–96.

In this communication is recorded what appears to be a case of primary cerebro-spinal meningitis due to infection with the bacillus of Yersin. The patient, a native of Dakar, was taken into hospital in an unconscious condition, with marked indications of cerebro-spinal

mischief, and died the following day. At the time of his death there was no suspicion of plague infection. Lumbar puncture was performed on two occasions before death and a thick, ropy, yellow pus was obtained for examination. Microscopically, Gram negative cocco-bacilli were seen within the leucocytes and in the surrounding fluid, in addition to involution forms strongly suggestive of *Bacillus pestis.* The suspicion aroused by these examinations was confirmed, subsequently, by cultural and animal inoculation tests.

R. St. J. B.

SHELDON (J. H.). **A Note on Plague Bacilli in an Unusual Situation in the Body.**—*Lancet.* 1915. June 19. p. 1294.

The author reports from Insein, Burma, a case of cerebro-spinal meningitis due to *Bacillus pestis.* The patient, an adult Burman male, died after an illness of only 36 hours; convulsions and head retractions being present during the last hour of life. A superficial examination of the body failed to discover any bubo or other gross lesion. "Specimens of peripheral blood were stained with gentian-violet and of the cerebro-spinal fluid with carbolfuchsin, and examination of the slides revealed the presence of typical plague bacilli in small numbers; the slides of the cerebro-spinal fluid simply swarmed with them."

R. St. J. B.

RUCKER (W. C.). **Bubonic Plague. A Menace to American Seaports.** *U.S. Public Health Rep.* 1915. Apr. 16. Vol. 30. No. 16. pp. 1140–1146. With a chart.

This communication is, in substance, a short review of the various plague preventive measures that have been advocated, from time to time, by the U.S. Public Health Service, in relation to port sanitation.

In addition to the rat proofing of docks and water fronts, the importance of carrying such work to a point where all premises occupied by man for domiciliary, mercantile or manufacturing purposes has been rendered proof against the entry of rodents is insisted on. Particulars are given of the various methods of rat proofing structures; special stress being laid on the use of concrete in the ground areas, the stoppage of accidental openings around plumbing and electric wires, the abolition of harbourages in double ceilings and the closure of roof openings by wire gratings.

In conjunction with such measures, the vigorous exclusion of rats from sources of food supply and the destruction of rodents by poisoning and trapping should be systematically carried out.

R. St. J. B.

CREEL (R. H.). **The Migratory Habits of Rats with Special Reference to the Spread of Plague.**—*U. S. Public Health Rep.* 1915. June 4. Vol. 30. No. 23. pp. 1679–1685. With 1 chart.

Some experiments have been recently carried out in New Orleans in relation to the migration of rats from one part of the city to another.

A number of live rats (*Mus norvegicus*) were collected by trapping and, after careful marking, were liberated. On March 28th 179 rats were released in the central residential section of the town; the animals, which were free from plague infection, were marked by punching both ears with a tonsil punch, the resulting mark being quite inconspicuous. On the same day ten rats were found dead within a short distance of the point of liberation and on the following day nine more were picked up. Between 48 and 60 hours from the time of release a half grown *norvegicus* was trapped some 19 blocks away, a distance of about a mile. In the course of its migration the rodent must have travelled across a main avenue (Canal Street), 150 feet in width. The travel was above ground, as there was no subsurface conduit. Within two weeks a number of rats were recaptured at points four miles distant from the point of release.

On April 8th a second lot of 113 rats were released in the wholesale provision warehouse district of the city, in order to see how far the different character of the territory might affect the migration. This district afforded ample harbourage for rodents, in the way of wooden culverts, drains, etc.; there was also an ample supply of rat pabulum available. As might have been expected, the migration in the second series was very much less marked. Whereas 40 of the 160 rats in the first series made widespread excursions, only 8 in the second series of 113 made any extensive travel.

The practical bearing of these experiments is very apparent. Had the rodents in question been harbouring plague infection in its early stages, it is probable that an epizootic would have resulted by means of a series of "relay" rodents.

Of the first series 103 rats and of the second series 60 were recaptured in 26 days [an eloquent tribute to the zeal and efficiency of the Public Health Service force].

R. St. J. B.

U.S. Public Health Reports. 1915. Mar. 26. Vol. 30. No. 13. pp. 891–892. **How Plague may be carried from Place to Place.**

A case of imported rat plague of unusual interest is reported from Seattle, Washington, U.S.A. Some time ago the State Horticulturist of Washington had occasion to open a large box of plants which arrived at the port of Washington from Yokohama, Japan; a rat was found in the soil at the bottom of the box and, on the body of the animal being delivered to the local representative of the Public Health Service, it was ascertained that the rodent was suffering from "chronic" [revolving] plague. Every circumstance pointed to the probability that the infected rat was shipped from Japan; the only alternative being that it entered the box at the appraiser's building at Seattle.

"The Public Health Service has instituted measures looking to the systematic examination of these shipments with the view of determining the relative frequency of such occurrences. When it is remembered that one infected rat is quite sufficient to reproduce the disease in any locality to which it may gain access, the importance of this circumstance can hardly be overestimated."

R. St. J. B.

WILLOUGHBY (W. M.). **Rat Plague and the Powers of a Medical Officer of Health to cope therewith.**—*Jl. Roy. Sanit. Inst. Lond.* 1915. Apr. Vol. 36. No. 3. pp. 132–136.

It is pointed out that although the powers of the Port Sanitary Authority under the Local Government Board orders of 1907, for dealing with ships in which an unusual mortality among the rats has occurred, is very great, the onus of finding if such mortality exists rests with the Sanitary Authority and not with the master or person in charge of the ship. It is suggested that an article should be added to the regulations "throwing a heavy onus on the master, the officer in charge, and the representative of the firm or authority discharging the cargo of any ship from a port infected with rat plague, of notifying forthwith to the medical officer of health for the district in which the ship arrives or is lying any mortality amongst the rats on the ship."

With regard to plague infected areas in the United Kingdom, by Article II of the "Destruction of Rats" order of 1910 the Local Authority shall (1) destroy all the rats in the district ["a large order"] and (2) prevent entrance into buildings and other premises; the expenses incurred to fall on the Port Sanitary Authority [Article IV.]

Objection is taken to the latter regulation on the ground that "where danger to the community arises from or is traceable to the act or default of certain persons, or further, if even arising through them but from circumstances beyond their control, these persons, as the introducing agents, should pay for the riddance of that danger. . . .

In short, the owners or users of the affected area should be called upon to exterminate the rats under the direction of and to the satisfaction of the medical officer of health, and at their own cost."

R. St. J. B.

HAFFKINE (W. M.). **Concerning Inoculation against Plague and Pneumonia and Experimental Study of Therapeutic Methods.**—*Indian Med. Gaz.* 1915. Apr. Vol. 50. No. 4. pp. 121–131; May. No. 5. pp. 175–180; June. No. 6. pp. 211–213; and *Jl. of Hygiene.* 1915. July. Vol. 15. No. 1. pp. 64–101.

In these communications Haffkine has collected together extracts from his evidence before the Indian Plague Commission in 1898, the pronouncements of the Commission in relation thereto, and portions of Sir A. E. WRIGHT's and Drs. W. PARRY MORGAN, L. COLEBROOK and R. W. DODGSON's "Report to the Witwatersrand Native Labour Association on the Results of an Inquiry into the Causation, Prophylaxis and Treatment of the Pneumonia which affects the Native Labourers in the Rand Mines.—Observations on Prophylactic Inoculation against Pneumococcus Infections, and on the Results which have been achieved by it."

Two of the members of the Plague Commission, Professor (now Sir) A. E. WRIGHT and Dr. RÜFFER had been initiated by Haffkine in the principles and methods of preventive inoculation, and it would appear from a statement by Sir A. E. WRIGHT that it was largely his views that guided the Plague Commission regarding certain aspects of anti-plague inoculation. In his notes Haffkine has emphasized the points of divergence between the Commission of 1898–99 and himself, which have come within the scope of the inquiry in South Africa above referred to.

The reviews are divided into Parts and Sections. Part I. deals with the prophylactic inoculation against plague and pneumonia and is divided into six sections. Section 1 deals with the question of effectivity of treatment in people who were already harbouring infection in the incubation period in their systems; Section 2 with the extension of treatment to patients in whom infection had progressed beyond the incubation stage and was manifested by morbid symptoms; Section 3 the question of the apparent protection afforded by specific inoculation against "other diseases"; Sections 4 and 5 the procedure for estimating numerically the effects of inoculation. All these sections refer to subjects in which the Indian Plague Commission of 1898–99 dissented from the views expressed by Haffkine, but concerning which Sir A. E. Wright and his co-workers have arrived at results agreeing in the main with Haffkine's conclusions. In the 6th section the author discusses the possibility of racial variation in the receptivity to plague among Indians and Europeans respectively. This question of racial variation has also been emphasized by Wright and his co-workers, as to differences observed in Europeans and Africans respectively in regard to the effects of bacteria on their respective bloods.

Part II. is concerned with experimental studies of curative methods, and contains an epitome of Haffkine's statistical enquiries in relation to his experimental work with Lustig's and other anti-plague sera. The article concludes with a defence of the statistical method of investigation as contrasted with the "experiential method," i.e. the process of taking into account the complex of impressions left, by experience, on the mind of the observer.

R. St. J. B.

Clark (H. C.). **Note on the Viability of *Bacillus pestis* in a Cadaver buried in Quicklime.**—*Proc. Med. Assoc. Isthmian Canal Zone.* Oct. 1912 to Mar. 1913. Vol. 5. Pt. 2. pp. 77–79.

In connection with the question of the viability of *Bacillus pestis* in the cadaver, some interesting particulars are reported from Flamenco Island, Panama. During excavation work conducted in that locality, the body of a plague victim, who died on the 23rd June 1909, which was buried in quicklime, was disinterred. The investigation in question was conducted on the 6th March, 1912. The remains were found to be incased in lime, with the exception of the dorsal surface of the body which was in direct apposition to the ground, the bottom of the coffin having disintegrated. The skeleton was practically intact, but no evidence of visceral tissue nor clothing remained. The skull and femur were chosen for bacteriological investigation; agar slopes being smeared with material taken from the inner table of the cranial vault and from the cancellous tissue of the femur. The resulting cultures showed a variety of saprophytic bacteria, yeasts and moulds, but no evidence of the presence of *B. pestis* was forthcoming. Guinea-pigs inoculated with large amounts of culture material remained alive and healthy, showing no evidence of infection during an observation period of six months.

In conclusion it is stated "that material infected with *B. pestis* in as large an amount as the human body could be buried in the manner

mentioned, and disinterred about two years and eight months later with perfect safety. It would seem reasonably certain that the saprophytic organisms had greatly aided the quicklime and that probably the remains could have been removed with equal safety long before the time mentioned."

R. St. J. B.

SWELLENGREBEL (N. H.) & HOESEN (H. W.). **Ueber bei der Diagnose der Rattenpest Schwierigkeiten bereitende Bakterien.** [Bacteria Causing Difficulties in the Diagnosis of Rat Plague.]—*Centralbl. f. Bakt.* 1. Abt. Orig. 1915. Vol. 75. No. 5/6. pp. 456–466. With 2 figs.

The bacteria that produce lesions in rats and other rodents, resembling those commonly associated with infection with *Bacillus pestis*, belong, for the most part, to the Enteritidis of Gaertner and the coli groups of organisms. They are readily distinguished from true plague organisms by means of the usual cultural reactions.

The authors have collected several strains of plague like organisms derived from ship's rats dead with gross pathological lesions resembling those of plague. Four of these strains resembled *Bacillus coli* ("Eemland," "Pyrrhus," "Loppersum" and "Rynland II"), but were easily distinguished by means of their cultural reactions, "Rynland II," for example, being a non indol producer, non gas producer in glycerin and sacchrose, and decolorising mannite, glucose, maltose and laevulose litmus broth. The two remaining strains examined, "Amsterdam" and "Rynland I," showed resemblances to *Bacillus typhi murium* and *Bacillus pseudotuberculosis rodentium*, respectively.

Precipitation experiments showed that any reaction with a serum dilution of less than 1/100 was of no significance. Working with an anti-plague serum from the Pasteur Institute, "Eemland," "Rynland II" and *B. Coli* gave a precipitate with a serum dilution of 1/50, but not with a dilution of 1/100. A strain of true plague ("Medan"), however, gave a significant precipitate with the latter dilution.

R. St. J. B.

MISCELLANEOUS.

KELLOGG (Vernon L.). **Spider Poison.**—*Jl. Parasit.* 1915. Mar. Vol. 1. No. 3. pp. 107–112.

The author was directed to the subject by the presence in the neighbourhood of Stanford University, California, of the "black widow" spider, *Latrodectes mactans*, which has the reputation of being one of the most poisonous. Of the genus Latrodectes one species is *L. malmigniatus*, well-known in Southern Europe; another species inhabits New Zealand; in America three species occur—*L. mactans*, which ranges from the northern boundary of the United States to Tierra del Fuego, *L. curacaviensis* from the West Indies and eastern South America, and *L. germetricus*.

Dr. COLEMAN noted the effect of *L. mactans* poison on a patient, on himself, and on cats and rabbits. The account of the patient's case is as follows:—

"Patient B. came to my office one morning at 8.15 o'clock, showing signs of an acute poisoning of some sort.

"The glans of the penis had been bitten by a spider while the patient was sitting in an outcloset. The only thing felt was a sharp sting. (The spider was captured so there is no doubt as to the species; it was a female of *Latrodectes mactans*). In about ten minutes there appeared dizziness and weakness of the legs, followed by cramps in the abdominal muscles.

"The patient left the field where working and started to walk to town, a distance of a little over a mile. The pains grew worse and the penis started to swell and turn red. When the office was reached, the pains of a cramp-like character, in the abdomen, were intense, also around the heart and thighs. Physical examination showed the heart to be running at the rate of 40 per minute, of small volume but regular. The respiration was labored. The pupils were dilated and face very red and congested. The penis was swollen to a great size, fully 3 inches in diameter at the glans, and the colour was a mottled purple. The contractions were clonic in character, giving the greatest pain in the chest and abdomen. There were no pains below the knees or elbows. . . .

"The next morning a fine rash appeared all over the body, accompanied by some itching. The penis had returned to nearly normal in size. The heart-rate was 60, the respiration 18 and deep, temperature 100. The rash disappeared in four days. The patient was troubled with insomnia for several days, and a stubborn constipation that took a very active purge to affect."

COLEMAN dissected out the poison glands of a female Latrodectes, macerated them in distilled water and added milk sugar in such proportion that there was 1/1,000 grain of poison in each grain of powder. He took 2 grain powders every hour for ten doses, with no effect but to decrease the heart's action. On a second occasion he took twenty powders followed by five the next morning. He describes his symptoms thus:—

"The heart-rate was 48, temperature 99, very severe headache, clonic spasms of the thoracic or abdominal muscles, marked distress about the heart with radiating pains extending to the left arm-pit and down to the elbow; had no bowel action for two days; pupils markedly dilated. It seemed a perfect picture of angina pectoris. The symptoms gradually subsided and in three days felt normal. I allowed a period of two weeks to intervene and repeated the experiment with the same symptom-complex picture. The trial was repeated a third time, with always the same results, as to occipital headache, constipation and clonic spasm of the muscles of chest and abdomen; also the pain and distress about the heart."

The inoculation of a cat with the maceration of the glands of one female Latrodectes killed it in ten minutes. A small quantity killed a cat in forty-five minutes. The eggs similarly treated and injected killed a cat in three minutes, and a rabbit in two and a half.

These observations show the deadly character of Latrodectes poison, and are confirmed by others. SACHS and KOBERT isolated from the spider's body a specific poisonous principle called arachnolysin, which is a powerful haemolysin as shown in the case of rabbits, rats, mice, geese and man. A diadem spider of 1·4 grains contained sufficient poison to destroy completely all the corpuscles in 2·5 litres of (drawn) rabbit blood. KOBERT distinguishes between the actual secretion of the poison glands and a toxalbumen which exists everywhere throughout the body of the spider, especially in the legs and eggs.

A. G. B.

WILSON (A. H.). **Notes of Two Cases of *Porocephalus armillatus* Infection occurring in Man.**—*S. Nigeria Ann. Med. Rep. for the Year ending Dec. 31st, 1913.* 1915. London: Printed by Waterlow & Sons, Ltd. pp. 71–73.

The first case was that of a Krooboy aged about 18, admitted to hospital at Degema, Southern Nigeria, on June 7th with ulceration of the cornea. "It was noticed that his general condition while in hospital was one of gradual and progressive asthenia, and within two weeks of his death his gait became staggering, reflexes were lost, and there were some vague pains about the legs." The heart's action was rapid, there was no murmur and no signs of cardiac incompetency. Death took place on July 14th. At the post-mortem the pericardium was found to be generally adherent, the right ventricle was found dilated, the left ventricle normal. The liver was slightly enlarged and nutmeg in appearance; on the surface were two "cicatricial-looking patches" which were found to be encysted larvae of Porocephalus; on further search ten more were found in the liver and one in the mesentery. None were to be found in the lung. Death was attributed to Porocephalus infection accelerated by pericardial disease.

Case 2 was that of a man aged about 50, first admitted to hospital on April 7th. Asthenia was progressive, so that he could only walk a few yards. The week before his death his abdomen became swollen and later the feet and legs. On September 11th there were signs of congestion of the lung and two days later he died. Post-mortem, a large amount of fluid was found in the peritoneal cavity, the lungs were oedematous and congested, the liver was tough and showed numerous cicatrical patches. Five liver cysts were found; nothing in the mesentery or lungs. The diagnosis was *Porocephalus armillatus* infection accelerated by congestion of the lungs. [For recent papers on this subject, see this *Bulletin*, Vol. 3, p. 276 and Vol. 4, p. 531.]

A. G. B.

PENSCHKE. **Prophylaxe gegen Sandflöhe.**—*Arch. f. Schiffs- u. Trop. Hyg.* 1915. Mar. Vol. 19. No. 5. pp. 150–151.

SOMMERFELD recommends as a preventive against chigoes the following—15 drops of lysol or cresol soap solution well mixed with 100 grams of vaselin. This is rubbed into the feet after they have been washed. In strongly infested places this measure has protected for three days. Chigoes which have penetrated before it was used die and can be more easily extracted than when alive. This process was reported on from various parts of German East Africa, but not always favourably. The author thinks it can be recommended.

A. G. B.

de MAGALHÃES (José Augusto), **A reacção local á picada do mosquito será um elemento de defesa?** [Is the Local Reaction in a Mosquito-Bite an Element of Protection?].—*Brazil Med.* 1915. Jan. 15. Vol. 29. No. 3. pp. 20–21.

The author propounds the theory that individuals who react severely to mosquito bites are much less likely to develop malaria afterwards than those in whom the bite causes little or no local irritation. Clinical facts in his experience can be adduced to support this view.

J. B. Nias.

HERMANT. **Avantages de la Rachianesthésie en Chirurgie tropicale.**—*Far East. Assoc. Trop. Med. C. R. Trois. Congrès Biennal, Saigon (1913).* 1914. pp. 454–457.

Anaesthesia is a great cause of anxiety to anyone who has to operate in the tropics. The anaesthetist is often not expert; changes in the liver, so frequent in tropical countries, add to the dangers of chloroform and even ether; and shock is to be feared. Spinal anaesthesia avoids these difficulties; it seems to be free from danger if it is limited to operations below the diaphragm. It is easy to carry out. It makes the operator master of his anaesthesia and takes away all pre-occupation. As to the seat of the puncture, the dorsolumbar space should be chosen. Attention should be paid to the position of the patient, on which depends the extent of the anaesthesia. It is good practice to let 10 cc. of the cerebro-spinal fluid run away before injecting. The author has used successfully stova-cocaine, stovaine, cocaine, novocaine, tropacaine, and stovaine with strychnine. In every case he has given a previous injection of scopolamine-morphine ($\frac{1}{4}$ mgm. of scopolamine + 1 cgm. of morphine). Anaesthesia has lasted longest with cocaine. Unfortunately with this substance there is sometimes vomiting and other symptoms, less frequent if coffee is given before the operation. These symptoms disappear completely if one replaces the scopolamine-morphine by a similar injection of sparteine strychnine (5 cgm. sparteine and 2 mgm. strychnine) given at the same time as the puncture. In default of cocaine JONNESCO's stovaine-strychnine method seems good.

With this form of anaesthesia the author has operated upon hepatic abscesses, appendicitis, ovarian cysts, strangulated hernias, etc. He is uncertain about the harmlessness of high puncture in the cervical dorsal region, and cites a case in which sudden death followed.

A. G. B.

MASSEY (A. Yale). **Spinal Analgesia in Native Practice.**—*Jl. Trop. Med. & Hyg.* 1915. Apr. 15. Vol. 18. No. 8. pp. 87–88.

For more than three years Dr. Massey, who writes from Lusambo, Belgian Congo, has been employing stovaine injected into the spinal theca for all operations below the umbilicus. To the objections to general anaethesia mentioned by HERMANT he adds the dread which the native has of losing consciousness. He punctures between the third and fourth or second and third lumbar spines, and prefers a long hollow needle of steel, as less liable to bend or break than platino-iridium. He describes his technique. He finds it advisable first to puncture the skin with a sharp scalpel. He uses for an adult 5 cgm. of stovaine in a cubic centimetre of fluid. This is contained in ampoules which may be had from James Flach, 16, Water Lane, London, the agent for Paulenc Frères, of Paris; they keep well. Or the solution may be made after Krönig's formula:—

Stovaine..	0·04 gm.
Chloride of sodium	0·0011 gm.
Distilled water	1 cc.

The anaesthesia continues for about an hour.

The author cannot too strongly recommend the method.

A. G. B.

CRAIG (Charles F.). **The Importance of Tropical Diseases to the American Practitioner, as Illustrated by their Occurrence in the United States.**—*Amer. Jl. Trop. Dis. & Prevent. Med.* 1915. July. Vol. 3. No. 1. pp. 5–16.

The writer points out that diseases once thought to be largely limited to the tropics have invaded temperate zones, and this process is likely to be accelerated as regards the United States by the opening of the Panama Canal. In this paper he calls attention to the occurrence of many so-called tropical diseases in the U.S.A.

Malarial fever. Estivo-autumnal malaria before the Spanish-American war was confined to the Southern States. Soon after the commencement of this war soldiers invalided home from Cuba and the Philippines introduced this type of infection into many hitherto free localities, and in some of these the severe forms of malarial fever are now endemic. They were at first unrecognised or diagnosed as typhoid or some other form of continued fever, with disastrous results. A personal experience of the kind is given from Connecticut.

Relapsing fever. This has occurred constantly since it was first recognised in 1844. It is due to *Spirochaeta novyi.* The author writes: "It is more than probable that even at the present time,

numerous cases of this disease occur which are not diagnosed, being mistaken for malaria, typhoid, or some other form of fever." He notes how few physicians ever make a microscopical examination of the blood in fever.

Dengue occurs commonly in the Southern States. It is noted that no effort appears to have been made to determine the period of infectiveness of the blood nor how long the mosquito may transmit the disease, in addition to other important points, in spite of the many opportunities for investigation.

Blackwater fever occurs in many of the Southern States and is always associated with the more severe forms of malarial infection. However, there has never been a really scientific study of blackwater fever made in the United States.

Undulant fever is known to be endemic in Texas. It is believed that " this fever occurs in many of our larger cities and is constantly being mistaken for typhoid, acute or chronic arthritis, malaria or some other febrile conditions."

Beriberi occurs not infrequently in the United States, but is generally unrecognised. Owing to the fact that the dietary of the American is usually balanced and varied it is of comparatively rare occurrence.

Bacillary dysentery is endemic and frequently occurs in the form of fatal epidemics especially among young children. Many such deaths could be avoided if the condition was recognised in time.

Amoebic dysentery is now known to have a world-wide distribution. Tropical dysentery, as it is often called, is a misnomer. The writer has personally observed cases originating in 16 states of the Union.

" Of 1,700 patients whose faeces were examined [at Rochester, Minnesota] during the past two and a half years, no less than 79 showed infections with *Endamoeba histolytica*, of which 42, or more than one-half, were infected in the Northern States, the remainder being from the more Southern States of the Union. Of the infections acquired in the Northern States, 14 were acquired in Minnesota, 12 in Iowa, 5 in North Dakota, 5 in South Dakota, 2 in Nebraska, 2 in Wisconsin, and 2 in Montana."

He draws attention to the importance of the discovery of " carriers " of this infection.

Amoebic abscess of the liver has frequently originated in the United States.

Leprosy. This disease often goes long unrecognised. Some years ago a case of leprosy was discovered in a servant to the interns in one of the large hospitals in U.S.A. For over a year he had suffered from a tubercular eruption on the face which was undiagnosed, till a physician recently returned from the Philippines remarked its resemblance to leprosy, when the bacillus was forthwith found.

Of animal parasites *Paragonimus westermanni* is endemic in hogs and human cases have been reported. *Clonorchis sinensis* has been reported in over 20 instances as well as cases of infection with *Dicrocoelium lanceolatum*, *Fasciola hepatica* and *Schistosoma haematobium*. *Hymenolepis nana* is widely distributed. Infections with *Filaria bancrofti* have been found as far north as New York City.

In the author's opinion a thorough knowledge of the subject of " tropical diseases" is absolutely essential to the conscientious American physician, and this knowledge must be based upon actual laboratory work and a study of clinical cases.

A. G. B.

van Loghem (J. J.). **Verslag van een Hygienische Informatie-Reis naar Egypte, Tor, Jeruzalem, Tunis en Algerije.** [Report of a Sanitary Tour in Egypt, El Tor, Jerusalem, Tunis and Algeria.]—*Koloniaal Instituut te Amsterdam, Mededeeling No. 3. Afdeeling Tropische Hygiene. No. 1.* viii + 142 pp. With 14 plates and various figs. 1914. Amsterdam: J. H. de Bussy.

This is the report of a two-months' tour made by the author at the end of the year 1913, on behalf of the Amsterdam Colonial Institute, for the purpose of collecting information as to the latest methods of dealing administratively with infectious diseases in the localities mentioned in the title. The author found time to visit in succession Alexandria, Cairo, Ismailia, Suez, El Tor (the Egyptian pilgrim quarantine station on the Red Sea), Jerusalem, Port Said, Algiers and Tunis. At all these places observations were made on the existing machinery for dealing with infectious diseases, purification of water-supply and so on, the result being the collection of a very instructive body of facts. To the general reader, perhaps, the most interesting section will be that on the pilgrim quarantine station at El Tor, where all persons returning from Mecca to European or Mediterranean countries are examined, disinfected and quarantined before being allowed to return to their homes. The research work done at this station receives due commendation. The account given of malaria prevention at Ismailia, Jerusalem, and in Algeria is also very good. Incidentally the author points out the exceptionally heavy toll taken of the adult male population in Mohammedan countries by the Mecca pilgrimage system. In the year 1912, out of 18,000 odd pilgrims from the Dutch East Indies alone, 2,600, in round numbers, died, being 14 per cent. This was a cholera year, but in the following year, when there was no cholera, the mortality was again 12 per cent., dysentery being apparently the principal cause of death. The illustrations given are both numerous and good, and altogether the author may be congratulated on having made a most excellent use of the time at his disposal.

J. B. N.

Gabbi (Umberto) & Others. **Le Malattie Tropicali dell' Italia Meridionale, della Sicilia e della Libia, etc.**—28 pp. With 4 maps. 1915. Roma: Tipografia Nazionale di G. Bertero e C.

This is an exhaustive catalogue of memoirs on the subject of the tropical diseases of Italy and its dependencies, which have appeared under the superintendence of Professor Gabbi between the years 1606 and 1914. It forms a useful work of reference.

J. B. N.

Clark (H. C.). **Incidence of Lithiasis at Ancon.**—*Proc. Med. Assoc. Isthmian Canal Zone for the Half Year Oct. 1912 to Mar. 1913.* Vol. 5. Pt. 2. pp. 7–14.

The labour employed by the Isthmian Canal Commission is chiefly drawn from the negro population of the West Indies. The author, after making 1,500 consecutive post-mortems at Ancon hospital, thought it of interest to determine the frequency of calculi of various types. Thirty-nine instances of biliary calculi were found—24 among 4,088 West Indian negroes, 9 among 230 Spanish Indians, and 3 among

108 Spanish. In nearly all the cases malarial pigment was present in spleen, liver and marrow and it is suggested that inspissation of the bile, a marked feature in malarial haemoglobinuria, may be an etiological factor. Eight cases of stone in the kidney or bladder were noted, and two cases of pancreatic calculi.

The summary is as follows :—

"(1). The findings at this hospital indicate a much less frequent occurrence of biliary calculi in the negro than in the white race living in the temperate zone, but they tend also to show a much greater incidence in the negro of the tropics than in his brother of the temperate zone.

"(2). Suggestive factors relative to etiology are the prevalence of enteritis, colitis, and malaria, especially the intestinal diseases.

"(3). Ancon Hospital findings would also indicate a higher percentage of cholelithiasis among the Old World Spaniards than authorities are willing to grant.

"(4). Calculi of the urinary passages in the negro would appear to be extremely rare."

[It is worth noting that in an examination of 281 bodies, 247 of which were Indian or European, at Calcutta in 1913 in only four instances were biliary calculi found (FOSTER).] A. G. B.

CLARK (H. C.). **Observations in Tropical Pathology. II. Three frequently Silent Lesions : Gastroduodenal Ulcers, Gall-Stones and Pancreatitis. Their Relative Incidence in Panama Canal Laborers as disclosed by Autopsy.**—*Amer. Jl. Trop. Dis. & Prevent. Med.* 1915. Mar. Vol. 2. No. 9. pp. 556–571.

This analysis relates to 2,100 autopsies of persons, nearly all young male West Indian negroes, who had spent their lives on the islands and on the Isthmus of Panama and were thought to be in good physical condition at the time they were recruited for service on the Panama Canal Zone. Practically all were outdoor labourers. The following table shows the race, sex and age incidence :—

	Gastro-duodenal ulcers.	Gallstones.	Pan-creatitis.	Total individuals autopsied.
West Indian negroes ..	82	49	8	1,598
Latin Americans (mestizo)	7	15	1	274
White race..	5	8	2	222
Yellow race	1	0	0	6
Totals	95	72	11	2,100
Males	82	52	9	1,743
Females	13	20	2	357
Totals	95	72	11	2,100
Under 30 years of age ..	37	21	6	1,132
30 years to 40 years ..	26	20	2	481
41 years to 50 years ..	19	12	2	296
51 years to 60 years ..	10	11	1	123
61 years to 70 years ..	3	5	0	46
Over 70 years	0	3	0	22
Totals	95	72	11	2,100

In his conclusions the author makes the following remarks: —

"It is surprising to find so many of these conditions occurring in an apparently healthy young adult male negro population. . . .

"The result of the analysis shows that gastro-duodenal ulcers rank first in order of frequency when both acute and chronic lesions are considered, and that chronic peptic ulcers occurred with the same frequency as gall-stones. Pancreatic disease, either local or general, was rarely encountered and then usually as a result of gall-stone or ulcer associations which acted as etiological factors.

"There was a coincident occurrence of two or more members of the trio in twenty-one of the individuals; gall-stones and ulcers of the duodenum or the stomach occurring together in 14 cases; gall-stones and pancreatitis in two cases; gall-stones and ulcers and pancreatitis in one case; ulcers and pancreatitis in four cases.

"It is plausible to believe that gall-stones and gastro-duodenal ulcers may at times be predisposing factors, one to the other, and it is certainly true that gall-stones and duodenal ulcers may at times produce pancreatitis.

"Clinical evidence has been offered in 19 of the cases of gastro-duodenal lesions; in 12 of the gall-stone cases, and in only one of the cases showing pancreatic disturbance." . . .

"It is reasonably safe to conclude that there is no other anatomical region of equal size in which there are so many closely related viscera that frequently harbor latent lesions capable of masquerading under so many deceptive clinical pictures, and the negro race must be kept in mind as victims of these three conditions when a differential diagnosis of an obscure condition in the upper abdomen is being considered."

A. G. B.

SCOTT (H. H.). **Reports on Vomiting Sickness.**—24 pp. 1915. Jamaica: Government Printing Office, Kingston.

This brochure contains two reports dated March 10th and June 6th, 1915, respectively. In February the author proceeded to the Montego Bay district of Jamaica to investigate an outbreak of vomiting sickness. He remained there for three days, saw several patients and performed five autopsies. He either saw or obtained detailed histories of 35 cases, 32 of which he regarded as genuine vomiting sickness. Details of the cases follow with an account of the food previously taken. Discussing these the author says that in 16 there was a definite history of eating ackees, or the water in which they had been boiled, at the meal preceding the onset of the illness. In six other cases ackees had probably been taken and in seven no history of eating ackees could be obtained, but "it must be noted that in every instance trees bearing ripe fruit were growing in the yard in which the huts were situated, and amongst the poor people it would be most unlikely that the use of a food which was ready to hand . . . would be avoided." He also notes that "salt-fish" was frequently named as an article of diet and it afterwards came to his knowledge that among these people "salt-fish" often means salted ackee.

People in Jamaica are convinced that ackees under certain conditions are poisonous, especially those which are gathered unopened or those which have been forced after falling unopened. An adult native is suspicious of such a fruit; children naturally would not be, hence the great incidence amongst children. It appears that the poison is extracted by boiling the affected fruit with water; in such cases the parents eat the ackees and the children get the pot water.

The author obtained some ackees which appeared good except for the fact that they were unopened or had been forced open after being

gathered. These were boiled with water and the extract was used for administration to animals, namely three kittens and one puppy. Full details of these experiments are given and of the post-mortem examinations. Of the symptoms of the animals the author writes :—

"They were all previously in good health and well nourished as are in my experience the majority of vomiting sickness subjects ; after taking the ackee extract an interval elapses (two hours in the human, one to one and a quarter in the animal) during which there are no symptoms of any importance ; this I regard as the interval during which absorption is taking place. Then, sudden vomiting occurs with recovery in a few instances (the poison being got rid of), or subsequent drowsiness, somnolence, and coma terminating in death (from cerebral and generalised action of the absorbed poison) ; or, in rarer instances still, the cerebral symptoms (drowsiness, coma) come on without any preceding vomiting—the so called "vomiting sickness without vomiting.' One symptom—convulsions—I did not see in the animal experiments, but it must be remembered that they are not always present in human cases of vomiting sickness either."

The conditions found post-mortem in these animals have all been reported in cases of human vomiting sickness. The histological findings are the same. The author gives a list of the points which a theory of the causation of vomiting sickness will have to satisfy. They are as follows :—

"(1). *Peculiar Seasonal Prevalence.*
"(2). Its *confinement to Jamaica* so far as is known.
"(3). *Sudden onset of symptoms in apparent good health,* and in the well nourished as in the emaciated.
"(4). The *rapid and complete recovery of non fatal cases.*
"(5). Affection of *several members in one house* or close neighbours in a settlement.
"(6). *Its vastly greater preponderance in children.*
"(7). *No preference as regards sex.*
"(8). *White children* practically *never attacked, East Indians rarely.*
"(9). The *Pathological changes* set up.

The ackee theory, he says, appears to meet all these. The disease corresponds exactly with the main ackee season ; it is limited to Jamaica and ackees appear not to grow "at all events to any extent" in the other islands. Finally, he states that hitherto unexplained points are all met by the view that the condition is an acute intoxication by a hot aqueous extract of unopened or unwholesome ackees.

[In reply to a query Mr. Edmund Baker, of the British Museum (Natural History), writes as follows :—"The akee plant is *Blighia sapida,* Koenig. It is only naturalised in Jamaica. It came from West Africa, Guinea, Ashanti, and Princes Island. It belongs to N. O. Sapindaceae. The seeds are hard and black, as large as a cherry with a prominent white arillus enveloping the lower half."

In 1906 Dr. C. W. Branch in a paper on vomiting sickness* referred to the fruit of the akee tree as containing a poisonous principle. Ackee poisoning was discussed by Captain T. J. Potter, R.A.M.C. [1912] in a report on vomiting sickness [see this *Bulletin,* Vol. 2, p. 105] ; he was unable to find any record of death from undoubted ackee poisoning. Further investigation will show whether Dr. Scott's view is correct. It will be necessary, as he says, to find out whether cases

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occur in parts where no ackees are obtainable, and similar enquiries should be made in West Africa, whence the tree comes. It is somewhat remarkable that the natives should not have discovered the cause of the disease if symptoms follow so promptly on ackee consumption.]

A. G. B.

BAILEY (W. F.). **A Case of Uta Venomosa.**—*Amer. Jl. Trop. Dis. & Prevent. Med.* 1915. Feb. Vol. 2. No. 8. p. 530. **With 1 plate.**

This brief report runs as follows :—

"*History of Case.*—Male, 43 years of age. Two years ago, while in the interior of Peru, this man was bitten by a small fly, which the Indians call '*Uta venomosa*' (or poisonous fly), a little, white, fuzzy thing no larger than a pin head. When it bites, the next day a very small blister appears, with a watery discharge. This man was bitten just above the right eye. That eye was eaten away, also his nose ; his right hand is in the same condition, as well as his right foot ; his face is a mass of pus, underneath. The flesh is a bright pink. There is no pain, but a very disagreeable odor.

"This disease is found only in Huanceco, Peru, and 45 leagues from there to the interior. When the Indians are bitten they apply gunpowder on the bite and set fire to it, with very good results. This is the only case of a white man ever known as having this disease in Peru."

A photograph shows that one eye and half the nose have disappeared, leaving in the latter situation a cavity, with ulceration or scarring or both over a considerable portion of the face. There is no information as to the presence or absence of a general infection such as syphilis.

A. G. B.

ARCHIBALD (R. G.). **Notes on the Case of No. 7560, Serjeant C. S., 1st Battalion, the Suffolk Regiment.**—*Jl. R. Army Med. Corps.* 1915. Feb. Vol. 24. No. 2. pp. 185–189. **With 3 plates.**

The patient had been stationed in Khartoum since January 1914 ; he had previously served in Alexandria. He was admitted to the hospital on September 24th, 1914. He had noted swelling in his legs two months before. On admission his temperature was 103°. He had symptoms of multiple peripheral neuritis in the legs and some signs of it in his upper limbs ; knee jerks were absent. There were anaesthetic areas over the calves in both legs and in the tips of the fingers. Foot drop was present. The heart was disordered in action—rate 120. The calves were tender. The disease was thought to be alcoholic neuritis with disordered action of the heart due to nicotine. On October 6th oedema of the legs and back was noted ; on October 12th, paresis ; on October 13th the tongue became excessively swollen and was incised. On October 14th he died. Portions of the organs were sent to the Wellcome Tropical Research Laboratory. A detailed account is given of what was found in the sectioned specimens.

The following remarks are made :—

"From the examination of the material obtained there can be no doubt that a systematic infection with a fungus was present, and *ipso facto* it was the *causa causans* of the patient's malady.

"The microscopical evidence tends to show that the infection was obtained via the intestinal tract, and that the initial lesion commenced in the ileum in the form of an ulceration set up by the presence of a fungus.

"The photomicrographs illustrate (*a*) the fungus *in situ* in the intestinal lesions; (*b*) a mycelium and spores of the fungus in the liver; (*c*) spores of the fungus in the blood vessels supplying the sciatic and posterior tibial nerve.

"Such evidence is sufficiently conclusive to warrant the diagnosis of a 'mycosis' being made.

"Unfortunately, as the condition was not suspected, neither culture nor animal experiments were carried out to determine the species of fungus present, consequently it was only possible to determine the fungus somewhat arbitrarily from its morphology as seen in the tissues, and more especially in the intestinal lesions. In the latter it appeared to possess characters which would allocate it either to the genus Endomyces or the genus Sporotrichum."

The author remarks that the evidence obtained points to an alimentary infection caused by the ingestion of food or water containing the fungus. The genus Sporotrichum has been found saprophytic on lettuces. The case is the first in the Sudan in which evidence has been obtained of systemic infection with a fungus. The marked clinical similarity to beriberi is noted; the lesions present in the sciatic and posterior tibial nerves were identical with those found in beriberi. The author thinks that more research is required to exclude the theory that beriberi is caused by some vegetable parasite.

Nine excellent photomicrographs illustrate the paper.

A. G. B.

MASSAGLIA (Aldo). **L'epidemia di ittero infettivo a Tripoli nell' anno 1912.** [The Epidemic of Infective Icterus at Tripoli in 1912.]—*Malaria e Malat. d. Paesi Caldi.* 1915. May–June. Vol. 6. No. 3. pp. 134–143.

The scope of this paper is less extensive than its title would imply, as it merely gives an account of the symptoms in three patients who came under the author's care in a Red Cross hospital. All three recovered, and from want of the necessary strains of laboratory bacilli it was not possible to test their serum reactions in anything like a satisfactory manner. Nothing but ordinary *B. coli* could be isolated from the stools. The epidemic of which these cases formed part has been reported on by RIZZUTI and SCORDO in a Government publication.

J. B. N.

i. CLARKE (J. T.). **Rheumatic Fever and Rheumatoid Arthritis: The Geographical Factor.**—*Lancet.* 1915. June 5. pp. 1169–1171.

ii. BAETZ (Walter G. F.). **One Hundred Cases of Acute Arthritis among Negro Laborers on the Panama Canal.**—*Proc. Med. Assoc. Isthmian Canal Zone for the Half Year Oct. 1912 to Mar. 1913.* Vol. 5. Pt. 2. pp. 61–70.

i. The author, who writes from Perak, Federated Malay States, points out that there is no rheumatic fever in the Malay Peninsula and it is extremely probable that the disease does not occur in any part of the tropics, at least at or near sea-level. The disease appears to be common in Egypt, which is hot but not tropical. In the course of eighteen years in the Malay peninsula he has never seen a heart with rheumatic lesions of the valves, nor has he met with chorea. Major BUCHANAN, I.M.S. and Mr. CANTLIE are quoted as to the

absence of rheumatic fever from the tropics, and a table is given from FOSTER* which shows that no lesions of the valves were found in 281 post-mortems at the Calcutta Morgue in 1913.

ii. Some of the most noted authorities in tropical medicine declare, the author writes, that acute articular rheumatism is practically non-existent among natives in the tropics. Hence the study described in the title. Traumatic arthritis, arthritis occurring during the course of pyogenic infections, and that frequently seen in disseminated tuberculosis were excluded. The cases were admitted to hospital in the course of twelve months. The majority came from the West Indies, a few from Central or South America. The diagnosis made on discharge was as follows: —

Syphilitic arthritis	63
Gonorrhoeal ,, ...	28
Undetermined ,, ...	6
Dysenteric ,, ...	2
Tubercular ,, ...	1
	100

With regard to the large number of cases ascribed to syphilis, the author states that clinical observations were corroborated by Wassermann tests, followed by the old therapeutic test of mercury and iodides, and occasionally by salvarsan.

"Objection may here be raised as to the validity of the Wassermann test in as highly a malarial region as ours, since it has been claimed that this test is frequently positive in malaria. That this conception is a fallacy has been amply proved in a paper by Doctor Bates, entitled "The Wassermann Test in the Tropics," read before the annual meeting of the American Medical Association, last June."†

There follows a description of the symptoms.

"The average case is admitted to the ward with a multiple, rather subacute arthritis. A genital scar is frequently found. As a rule there is no fever and the joint pain is only severe on pressure. The joints usually involved are the knees, elbows, sterno-clavicular, ankle, and wrist. The finger and toe joints are seldom affected. There is moderate swelling but marked effusion is rare. The involvement of the periarticular bursae and of the tendon sheaths is very rare. In other words, the inflammation is limited to the joint, the latter being simply boggy and tender to pressure. . . . The most reliable concomitant sign of syphilitic arthritis was acute osteoperiostitis of the sternum and of the long bones, especially of the posterior surface of the tibia. The patient is usually very sensitive to even moderate pressure when this exists. . . . The cases, with few exceptions, probably belong to the late secondary stage."

Details of the treatment are given.

In the case of gonorrhoeal arthritis the clinical picture is quite different. The temperature is generally raised, pain and tenderness are much more marked, the joints are frequently distended with fluid, and inflammation often extends to the periarticular bursae and tendon sheaths.

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* *Indian Medical Gazette.* 1915. Vol. 50. p. 15.

† *Archives of Internal Medicine.* 1912. Nov. Vol. 10. pp. 470–477.

The summary is as follows:—

"Ninety-one per cent. of the acute arthritis of the series admitted to the male negro medical wards during the past year, were caused by venereal disease. Sixty-three per cent. were of syphilitic etiology, the Wassermann test being positive in 93·6 per cent. of these cases. An intensive mixed treatment, carried to the point of maximum tolerance, has enabled these men to return to work temporarily, in an average of 18·8 days per man.

"Twenty-eight per cent. were of gonorrheal origin. Vaccine treatment gave very good results, sometimes brilliant ones, in the great majority of cases. Unfavourable results due to the treatment were not noticed. The average number of days under treatment per man was 24.

"All other types of arthritis were in such minority that they are practically negligible.

"Acute articular rheumatism was not encountered and acute or chronic endocarditis was not recognised in any of the total 100 cases."

A. G. B.

PYMAN (Frank Lee). **Some Interesting Drugs of Tropical Origin.**—*Trans. Soc. Trop. Med. & Hyg.* 1915. Apr. Vol. 8. No. 6. pp. 167–193.

The drugs of tropical origin dealt with by Dr. Pyman were ipecacuanha, cinchona, coca, jalap and scammony, camphor, rhubarb, *Combretum sundiacum* (the anti-opium plant), Chaulmoogra oil, gurjun oil, thymol and carvacrol, oil of chenopodium, santonin, gum acacia, senna, *Calotropis procera*, strophanthus, and physostigmine. In each case are given, the history of the discovery and introduction of the drug, where found, method of collecting, chemical constitution, etc. Only a few points can be touched on here.

Emetine and cephaelin are derived from iso-quinoline, the parent compound of the alkaloids of opiums. Reference is made to MARKHAM CARTER (1914), who found that "the true emetine amebacidal effect is delayed in patients who are confirmed opium eaters and . . . from the slaves of opium we get our cases of rapidly fatal, acute, gangrenous dysentery." Pyman suggests that in the case of opium eaters the amoebae have developed a tolerance to certain "pharmacophore" groups common to emetine and some of the opium alkaloids.

The section on cinchona is of special interest. The following table shows the quantity of the four crystallizable alkaloids and of the amorphous alkaloid, quinoidine, contained in "cinchona febrifuge" and "residual alkaloid," both amorphous mixtures of bases, respectively. "Residual alkaloid" is the residue left after the extraction of the quinine. "Cinchona febrifuge" is obtained from a species which contains only a small proportion of quinine. "Quinoidine" is the residue obtained when no more alkaloids can be extracted.

	"Cinchona febrifuge."	"Residual alkaloid."
Quinine	7 per cent.	3 per cent.
Cinchonidine	6 ,,	2 ,,
Quinidine	23 ,,	20 ,,
Cinchonine	19 ,,	35 ,,
"Quinoidine"	29 ,,	30 ,,
Water, etc.	16 ,,	10 ,,
	100 per cent.	100 per cent.

All the preparations named have been employed in malaria. MacGilchrist suggests that cinchonine is superior to the other crystallizable alkaloids. The author writes:—

In comparing the two classes, (*a*) the four crystalline alkaloids, quinine, quinidine, cinchonine, and cinchonidine, and (*b*) the three amorphous preparations, "cinchona febrifuge," "residual alkaloid," and "quinoidine," three chief differences may be noted:—

"1. The former are employed as salts, whilst the latter are used as bases. It is possible that the use of the latter as bases may be responsible for the accompanying nausea; and it would be interesting to learn whether the salts of the three amorphous alkaloidal preparations were also liable to cause this effect.

"2. The former are crystalline, the latter amorphous. This may well affect the rate of absorption.

"3. The former are simple substances, whilst the latter are mixtures."

He recalls recent work on the synergism of the opium alkaloids; e.g. morphia mixed with narcotine in certain properties is more active than when pure, although the action of narcotine alone is much slighter than that of morphine.

Chaulmoogra oil is the fatty oil expressed from the seeds of *Taraktogenos kurzii*, King, a large tree indigenous to Burma and Assam. Similar oils are obtained from *Hydnocarpus wightiana*, Blume and *H. anthelmintica*, Pierre, which have a reputation in India and China as remedies in leprosy. These three oils are physically and chemically nearly identical. It is not known whether the two last-named are really inferior to that of Taraktogenos.

Oil of chenopodium, or American worm-seed oil, is distilled from a weed; its active principle is ascaridol. Schuffner and Vervoort found it superior to any other vermifuge in the treatment of 1,457 cases of hook-worm disease.

The author concluded with an appeal for the collection of information with regard to native remedies, stating that (1) in the case of such as seem worth investigation a quantity of not less than seven pounds is desirable; (2) the plant should be accessible in quantity; (3) a specimen of its parts should be procured to permit of botanical identification; (4) confirmation of its action in disease should, if possible, be obtained from competent observers. A. G. B.

Young (W. J.). **The Metabolism of White Races living in the Tropics. 1. The Protein Metabolism.**—*Ann. Trop. Med. & Parasit.* 1915. Mar. 18. Vol. 9. No. 1. pp. 91–108.

Reference is made to the work of Eijkman, McCay and others. In this enquiry, conducted at the Biochemical Laboratory, Australian Institute of Tropical Medicine, fairly complete analyses were made of the daily urine of four male subjects between 25 and 36, who had resided in tropical Queensland from one to four years. They were not restricted in their diet. The methods are detailed and the results set forth in tables. The observations bore on the volume, specific gravity and total nitrogen; the urea; the ammonia; the creatinine and creatine (the latter was only present on one occasion); the uric acid, purin bases, phosphoric acid, chlorides and sulphur. The conclusions reached are that, as far as the experiments go, no marked variations are shown from the averages obtained in temperate climates. For the details the paper should be consulted. A. G. B.

Book Reviews.

McClure (J. Campbell), [M.D. (Glasgow).]. **A Handbook of Fevers.**—viii + 470 pp. with 27 charts, 1914, London: Shaw & Sons. [Price not stated.]

In the preface to this interesting volume the author states that it is for the use of students and general practitioners and that attention is confined as much as possible to the practical aspects of the diseases; "only such points in epidemiology and bacteriology have been dwelt upon as seem to be absolutely necessary." Each specific fever is considered in turn under the headings, Definition, Incubation, Rash, Clinical types, Diagnosis, Complications and Sequelae, Treatment, Diet, Epidemiology and Method of Infection, Home Prophylaxis, and Public Health Administration.

As will be seen in the course of this review, in a journal for tropical practitioners it is thought necessary to comment on statements which in a home medical journal might pass muster.

After an introductory chapter on fevers in general the book is divided into (1) Fevers of Known Bacteriology, amongst which plague, cholera, relapsing fever, malaria, dysentery and kala azar, and to a less extent enteric fever, are of interest to readers of this *Bulletin*; (2) Fevers of Uncertain Bacteriology, including typhus, yellow fever and smallpox; and (3) Acute Diseases frequently attributed to a Diet consisting largely of certain Cereals—beriberi and pellagra. It is difficult to see why beriberi and pellagra find a place in a book on fevers, whereas undulant fever does not.

In the first chapter the author expresses himself against antipyretic drugs. If fever cannot be reduced by external applications of tepid, cold, or iced water it is improbable that any drug will succeed without jeopardising the life of the patient. He advises that a due proportion of as much soluble carbohydrate as can be tolerated be added to the nitrogenous food which is given to prevent tissue wasting, so as to ensure a proper utilisation of the latter. As to alcohol, "used with discretion and in moderation, it is often of the greatest service"; more than two to four ounces in the day is rarely necessary.

In the chapter on relapsing fever two clinical types are described—the European and Indian type and the African type. The remark that the duration of the paroxysm distinguishes relapsing fever from malaria does not hold for Central Africa, where microscopical examination of the blood is essential for diagnosis. As regards that region, to the list of complications and sequelae should be added facial paralysis and iritis. Readers of this *Bulletin* will not subscribe to the statement that no drug treatment has been introduced which has been successful in cutting short the course of the disease; salvarsan, neosalvarsan, galyl and ludyl have been used with unquestionable benefit [this *Bulletin* Vol. 1, p. 34 and 628; Vol. 3, pp. 3 and 397; etc.].

Malaria receives 20 pages, probably sufficient for the practitioner in the British Isles. The incubation period is given as 24 hours and upwards. It is doubtful whether such a short incubation as 24 hours has been authenticated for any form of malaria. The author's remarks on the treatment of malignant infections are not in all respects accordant with present day knowledge. He advises that quinine be given intramuscularly "on the slightest hint of the onset of nervous symptoms . . . . as any delay in getting the patient under the influence of quinine may result in his death." Again "if the malignant attack continues it is well to resort to intramuscular or intravenous injections." There can hardly be a doubt of the superiority of intravenous over intramuscular quinine medication, absorption from the muscles being a slow process, so that in such emergencies the intramuscular method is not advisable Otherwise the remarks on the treatment of malaria are judicious.

Of the treatment of the enlarged spleen of malarial cachexia the author writes:—"A heroic practice may be resorted to, which is sometimes very successful, the injection of 20–30 minims of turpentine subcutaneously into the abdominal wall overlying the splenic enlargement." Dr. Muir

of Kalna uses turpentine in a less heroic dose intramuscularly for chronic malaria as well as kala azar [see this *Bulletin* Vol. 2, p. 327]. The result is a polymorphonuclear increase followed by marked improvement of the signs and symptoms. The injections are given weekly.

"The existence of pools of still water is absolutely necessary to the breeding of the mosquito with which malaria is so closely connected," is not true for the tropics. The following statement may be quoted with approval—"It has been shown in British Colonies that the belief in the mosquito-malarial theory on the part of the governor has been half the battle in freeing a district from malaria, while an obstinate and unbelieving set of officials have made the efforts of the medical officer of no avail."

Bacillary and amoebic dysentery receive 14 pages. In the account of bacillary dysentery 'carriers' are not mentioned. As to amoebic dysentery, under heading diagnosis there is a short description of the amoeba, but no mention of *Entamoeba coli* from which *E. histolytica* has to be distinguished. Details are given as to the use of ipecacuanha but emetin is not mentioned, though its successful use was first reported by ROGERS in June 1912, and confirmed by other workers in the same year. The introduction of emetin for the treatment of amoebiasis is, without doubt, one of the most important discoveries of the time. Several cases of amoebic dysentery have been reported in persons who have never quitted France, Great Britain or the northern United States; it is hardly correct, therefore, to say, as does the author, that the disease is not found, save in the form of occasional imported cases, in the more temperate latitudes.

In the account of the epidemiology of kala azar the Sudan is mentioned but not the countries of the Mediterranean coast, nor is the closely-allied, if not identical, disease in dogs referred to. The introduction of tartar emetic for the treatment of this disease is doubtless too recent for inclusion in the book.

An interesting article on typhus extends to 26 pages. The author states that it is practically unknown in the United States of America. Dr. J. F. ANDERSON however estimated that 172 cases occurred in six cities in the year 1912 alone (this *Bulletin* Vol. 2, p. 639); it was formerly unrecognised and known as Brill's disease. The author discusses the mode of infection without mentioning the louse. Transmission of typhus by the body louse was effected by NICOLLE, COMTE, and CONSEIL in Tunis (1909) and by RICKETTS and WILDER in Mexico (1910); further successful experiments were published by NICOLLE and CONSEIL in 1911. GOLDBERGER and ANDERSON brought a similar proof for the head louse (1912). An interesting account of these researches and their bearing on epidemics of the past has been given by Col. BIRT (*Journal of the Royal Army Medical Corps*, 1912, Vol. 19, pp. 521–30). It is hardly necessary to refer in more detail to this matter as nearly every medical journal which comes to hand brings similar evidence from the field of war.

The following statements in the book may be contrasted—(1) "Until the causal agent of typhus is definitely discovered, the method of infection must be a matter of pure conjecture. (2) No specific organism has as yet been discovered as the cause of yellow fever . . . . The disease is transmissible apparently only through the agency of a certain type of mosquito." The first statement is of course incorrect.

Dr. McClure has evidently a poor opinion of the theory that beriberi is acquired by the use of a one-sided diet, deficient in "vitamine." At present, he writes, new evidence all goes to show that the disease is the result of infection by a specific germ which is conveyed to man by some intermediary, of the nature of the louse or bug. Is Dr. McClure unaware of the publications of BRADDON and of FRASER & STANTON from Malaya, and of HEISER and others from the Philippines? These give proof, as absolute as can be obtained in such matters, that the disease in those localities results from the use of a certain kind of rice, the "deficiency" in which is not made up by other ingredients of the diet. There is more recent evidence still, but too recent for inclusion by the author.* The

* VEDDER (Edward B.). Beriberi.—viii+427 pp. With 5 coloured plates and numerous engravings. 1913. London: John Bale, Sons & Danielsson, Ltd.

reviewer is unaware of satisfactory evidence of transmission by insect intermediaries, though several authors have declared their belief in it. Dr. McClure states also that the study of outbreaks in gaols in the East goes to show that the disease will persist in certain gaols "despite all changes of diet." Such cases, if indeed they exist, need very careful scrutiny. In view of the many gaols, e.g. the Bilibid prison in the Philippines* and several in Malaya (this *Bulletin*, Vol, 4, p. 145), in which the disease has been eradicated solely by a change of diet, it is permissible to think that the cases which Dr. McClure has in mind might be explained without recourse to the hypothetical insect transmitter. It is of course true that other factors may operate in some epidemics and it may well be that the term beriberi covers more than one disease, with differing aetiology, but we shall not advance knowledge by refusing to accept what has been demonstrated in many places in the far East. It is unfortunate that in none of the epidemics of 'beriberi' acquired on a varied and vitamine-full diet has the report been so detailed as to be free from criticism by those who uphold deficiency as an all-covering explanation. Such outbreaks should be exhaustively studied by unbiased and well-trained observers.

Although several statements in the book have been called in question the reviewer can state that he has read it with pleasure. The clinical portion—which, be it remembered, forms the bulk—appears for the most part excellent; the epidemiological, as far as tropical diseases are concerned, seems out of date, giving rise to the suspicion that it was written some years ago and has not been revised. One hopes that a second edition will soon be called for and the defects remedied.

The book is clearly written and well printed and has a full index. Temperature charts are furnished at the end of most of the chapters.

A. G. B.

BROOKE (Gilbert E.) [M.A. Cantab., L.R.C.P. Edin., D.P.H., F.R.G.S.]. **Aids to Tropical Medicine.**—2nd Edition. xii + 230 pp. F'cap. 8vo. With 30 text figs. 1915. London: Baillière, Tindall & Cox. [Price 3/6 net, cloth; 3/– net, paper.]

This little book, the first edition of which was published in 1908, contains a great deal of information in small compass. It has, the author states, in great part been rewritten, and chapters have been added on Three-day fever, Verruca [*sic*] peruana, Snake bite, Disinfectants, Fleas, Flies, Mosquitoes, and Rats. The chapters are arranged alphabetically according to the headings, which is probably convenient for a book intended for ready reference but has the disadvantage of separating conditions which would naturally come together, e.g. hepatitis and liver abscess, schistosomiasis in Egypt and in the East, the former of which is found under Bilharziasis, the latter mentioned under Distomiasis. The tables are a useful feature; among them may be mentioned those concerning the trematodes of man and their ova, the human filariae, the chief species of anophelines of importance, and synopses of genera of rats and of species of *Mus* and *Nesokia*.

Of the new chapters that on verruga suffers from having been written just before the publication of the work in Peru of STRONG and his colleagues. The useful chapter on Disinfectants includes an account of camp sterilization of potable water, for which THRESH's method (chlorinated lime and "hypo" in ¼ and ½ pound tins) is recommended. The chapter on Fleas includes an account of their anatomy, life-history and habits, and classification. Under Flies are considered phlebotomus, Tabanidae, and Muscidae, the latter including house-flies, tsetse-flies and stomoxys. The chapter on Mosquitoes includes a brief scheme of diagnosis of Anopheline genera as well as notes on the important species. As Dr. Brooke has evidently found NEAL's method of repelling mosquitoes useful—it is described thrice in the book—it may be mentioned that it consists in

* *loc. cit.*

dabbing a solution of one ounce of Epsom salts dissolved in half a pint of water on exposed parts of the body and allowing it to dry; this is stated to be "quite protective." But the most considerable addition is the chapter on Rats, covering as it does 15 pages of small print. This would seem rather a full measure of zoology in such a small book, but the data given should be extremely useful and are not found in text books. An appendix contains Notes on the seven commonest carriers of malaria and a Condensed bibliography, giving the titles and prices of recent books.

Naturally there are statements which may be criticised. The most important concerns the aetiology of beriberi. Dr. Brooke devotes about two pages to the "rice-food theory" and tabulates seven arguments against it. But surely no one now regards "deficiency" in rice diet as anything but a special case of deficiency, which bulks prominently because rice is the staple food in the East. It is no argument against the deficiency theory that beriberi prevails where no rice is eaten. Rice free diets may be equally wanting in vitamine. Ankylostomiasis (one is glad that the ugly form agchylostomiasis is not adopted) is defined as an anaemic cachexia induced by *A. duodenale, N. americanus,* and *A. ceylanicum*; LANE, who found this worm in natives of India, questions whether it is ever present in man in sufficient numbers to produce symptoms. It would seem premature to lump together the usually accepted species of Leishmania as *L. donovani.* It does not seem to be the case that espundia, or uta, begins as a sore on a mucous surface, but rather as a nodule on the skin, afterwards affecting mucous surfaces. In the chapter on pellagra the theory of deficiency is not mentioned, though it was discussed by Dr. SANDWITH in 1913, and has several supporters. Of spirochaetosis Dr. Brooke says—"No drugs have any specific action." Salvarsan and other arsenicals appear to bring the disease in many regions to a speedy end.

Another point, mainly of historical importance, in the account of yellow fever. One reads—"Most of our knowledge of the etiology of yellow fever is due to the work of the French Mission to Brazil in 1903. Useful work was also done by a U.S.A. Commission in 1900." The last sentence hardly does justice to the pioneers in this research, one of whom paid for the proof of mosquito transmission with his life.

These however are but small blemishes and to those who like their information in a condensed form and in a manual which will slip into and not bulge the pocket the book may be recommended. Misprints of importance are few—KEDDER for VEDDER (p. 14) and "bladders" for "gall bladders" (p. 39) were noted.

Undulant fever appears as "Malta fever" in spite of the adoption of the former name by the Tropical Section of the International Medical Congress, London (1913).

A. G. B.

CUNNING (Joseph). [M.B., B.S., F.R.C.S.]. **Aids to Surgery.**—3rd Edition. viii + 416 pp. Fcap. 8vo. 1913. London: Baillière, Tindall & Cox. [Price 4/- net.]

This little book is one of a series stated to be "specially designed to assist students in grouping and committing to memory the subjects upon which they are to be examined." The fact that since its publication in 1904 it has now reached a third edition goes to show that it is of value for this purpose.

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